```
#Install kaggle
!pip install -q kaggle


#Upload you API token kaggle.json:
from google.colab import files
files.upload()
```

```
Choose Files kaggle.json
• kaggle.json(application/json) - 69 bytes, last modified: 1/25/2025 - 100% done
Saving kaggle.json to kaggle.json
```

```
 #Create a directory kaggle , move the kaggle.json to kaggle directory , change permissions to the file :
!mkdir ~/.kaggle


!mv kaggle.json ~/.kaggle/


!chmod 600 ~/.kaggle/kaggle.json


#!/bin/bash
!kaggle datasets download -d kaggleashwin/vehicle-type-recognition
```

```
Dataset URL: https://www.kaggle.com/datasets/kaggleashwin/vehicle-type-recognition
License(s): apache-2.0
Downloading vehicle-type-recognition.zip to /content
 96% 153M/159M [00:01<00:00, 143MB/s]
100% 159M/159M [00:01<00:00, 149MB/s]
```

```
#!/bin/bash
!kaggle datasets download kaushalrimal619/lumpy-skin-disease-cow-images
```

```
Dataset URL: https://www.kaggle.com/datasets/kaushalrimal619/lumpy-skin-disease-cow-images
License(s): unknown
Downloading lumpy-skin-disease-cow-images.zip to /content
100% 4.27G/4.28G [00:58<00:00, 85.9MB/s]
100% 4.28G/4.28G [00:58<00:00, 78.4MB/s]
```

```
!unzip lumpy-skin-disease-cow-images.zip


import tensorflow as tf

# Check for GPU availability
print("Num GPUs Available: ", len(tf.config.list_physical_devices('GPU')))

if tf.test.gpu_device_name():
    print(f"Using GPU: {tf.test.gpu_device_name()}")
else:
    print("No GPU found. Make sure you've enabled GPU in Colab.")
```

```
Num GPUs Available:  1
Using GPU: /device:GPU:0
```

```
import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense, Dropout, BatchNormalization
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras.callbacks import EarlyStopping
import os
import shutil
import matplotlib.pyplot as plt



# Step 1: Organize Dataset
infected_dir = '/content/infected/infected'
normal_dir = '/content/normal/normal'

def create_dataset(infected_dir, normal_dir):
    dataset_dir = '/content/dataset'
    train_dir = os.path.join(dataset_dir, 'train')
```

```
        os.makedirs(train_dir, exist_ok=True)

        infected_train_dir = os.path.join(train_dir, 'infected')
        normal_train_dir = os.path.join(train_dir, 'normal')
        os.makedirs(infected_train_dir, exist_ok=True)
        os.makedirs(normal_train_dir, exist_ok=True)

        for file in os.listdir(infected_dir):
            shutil.copy(os.path.join(infected_dir, file), infected_train_dir)

        for file in os.listdir(normal_dir):
            shutil.copy(os.path.join(normal_dir, file), normal_train_dir)

        return dataset_dir

    dataset_dir = create_dataset(infected_dir, normal_dir)



    # Step 2: Data Generators
    train_datagen = ImageDataGenerator(
        rescale=1.0 / 255,
        validation_split=0.2,
        rotation_range=20,
        width_shift_range=0.2,
        height_shift_range=0.2,
        zoom_range=0.2,
        horizontal_flip=True
    )

    train_generator = train_datagen.flow_from_directory(
        os.path.join(dataset_dir, 'train'),
        target_size=(128, 128),
        batch_size=32,
        class_mode='binary',
        subset='training'
    )

    val_generator = train_datagen.flow_from_directory(
        os.path.join(dataset_dir, 'train'),
        target_size=(128, 128),
        batch_size=32,
        class_mode='binary',
        subset='validation'
    )
```

```
Found 3200 images belonging to 2 classes.
Found 800 images belonging to 2 classes.
```

```
    # Step 3: Build the Model
    model = Sequential([
        Conv2D(32, (3, 3), activation='relu', input_shape=(128, 128, 3)),
        BatchNormalization(),
        MaxPooling2D(pool_size=(2, 2)),

        Conv2D(64, (3, 3), activation='relu'),
        BatchNormalization(),
        MaxPooling2D(pool_size=(2, 2)),

        Conv2D(128, (3, 3), activation='relu'),
        BatchNormalization(),
        MaxPooling2D(pool_size=(2, 2)),

        Flatten(),
        Dense(256, activation='relu'),
        Dropout(0.5),
        Dense(1, activation='sigmoid')  # Output layer for binary classification
    ])
```

```
/usr/local/lib/python3.11/dist-packages/keras/src/layers/convolutional/base_conv.py:107: UserWarning: Do not pass an `input_shape`/`inpu
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)
```

```
    # Step 4: Compile the Model
    model.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accuracy'])
```

```
# Step 5: Train the Model
early_stop = EarlyStopping(monitor='val_loss', patience=5, restore_best_weights=True)

history = model.fit(
    train_generator,
    epochs=25,
    validation_data=val_generator,
    callbacks=[early_stop]
)
```

```
Epoch 1/25
/usr/local/lib/python3.11/dist-packages/keras/src/trainers/data_adapters/py_dataset_adapter.py:122: UserWarning: Your `PyDataset` class
  self._warn_if_super_not_called()
100/100 ━━━━━━━━━━━━━━━━━━━━ 157s 1s/step - accuracy: 0.8976 - loss: 1.5282 - val_accuracy: 0.5000 - val_loss: 70.8111
Epoch 2/25
100/100 ━━━━━━━━━━━━━━━━━━━━ 132s 1s/step - accuracy: 0.9831 - loss: 0.1825 - val_accuracy: 0.5000 - val_loss: 77.4527
Epoch 3/25
100/100 ━━━━━━━━━━━━━━━━━━━━ 134s 1s/step - accuracy: 0.9876 - loss: 0.2018 - val_accuracy: 0.5038 - val_loss: 29.1804
Epoch 4/25
100/100 ━━━━━━━━━━━━━━━━━━━━ 149s 1s/step - accuracy: 0.9862 - loss: 0.1574 - val_accuracy: 0.5487 - val_loss: 35.5958
Epoch 5/25
100/100 ━━━━━━━━━━━━━━━━━━━━ 124s 1s/step - accuracy: 0.9926 - loss: 0.0601 - val_accuracy: 0.7275 - val_loss: 11.4234
Epoch 6/25
100/100 ━━━━━━━━━━━━━━━━━━━━ 140s 1s/step - accuracy: 0.9950 - loss: 0.0513 - val_accuracy: 0.7400 - val_loss: 11.6773
Epoch 7/25
100/100 ━━━━━━━━━━━━━━━━━━━━ 132s 1s/step - accuracy: 0.9908 - loss: 0.0958 - val_accuracy: 0.8425 - val_loss: 3.9482
Epoch 8/25
100/100 ━━━━━━━━━━━━━━━━━━━━ 124s 1s/step - accuracy: 0.9939 - loss: 0.0628 - val_accuracy: 0.7850 - val_loss: 8.9398
Epoch 9/25
100/100 ━━━━━━━━━━━━━━━━━━━━ 140s 1s/step - accuracy: 0.9911 - loss: 0.1514 - val_accuracy: 0.8562 - val_loss: 6.1548
Epoch 10/25
100/100 ━━━━━━━━━━━━━━━━━━━━ 142s 1s/step - accuracy: 0.9947 - loss: 0.0572 - val_accuracy: 0.6775 - val_loss: 20.4675
Epoch 11/25
100/100 ━━━━━━━━━━━━━━━━━━━━ 132s 1s/step - accuracy: 0.9920 - loss: 0.0654 - val_accuracy: 0.7937 - val_loss: 7.1895
Epoch 12/25
100/100 ━━━━━━━━━━━━━━━━━━━━ 133s 1s/step - accuracy: 0.9988 - loss: 0.0072 - val_accuracy: 0.8388 - val_loss: 4.7486
```

```
# Step 6: Save the Model
model.save('cow_health_classifier.h5')
```

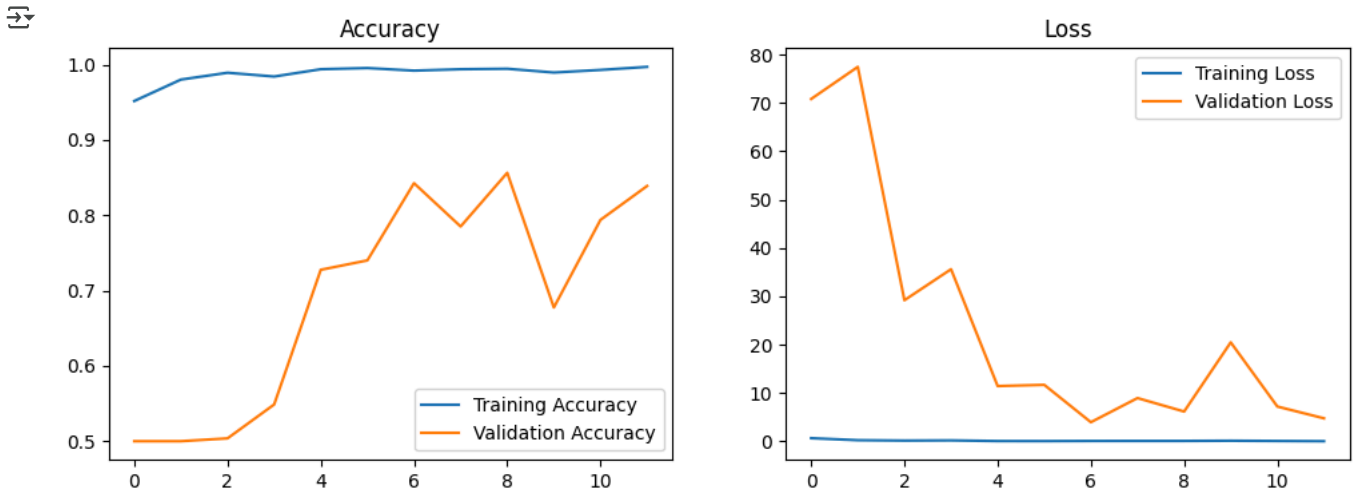
```
WARNING:absl:You are saving your model as an HDF5 file via `model.save()` or `keras.saving.save_model(model)`. This file format is consi
```

```
# Step 7: Plot Training and Validation Accuracy and Loss
plt.figure(figsize=(12, 4))

plt.subplot(1, 2, 1)
plt.plot(history.history['accuracy'], label='Training Accuracy')
plt.plot(history.history['val_accuracy'], label='Validation Accuracy')
plt.legend()
plt.title('Accuracy')

plt.subplot(1, 2, 2)
plt.plot(history.history['loss'], label='Training Loss')
plt.plot(history.history['val_loss'], label='Validation Loss')
plt.legend()
plt.title('Loss')

plt.show()
```




```
from google.colab import files
files.download('cow_health_classifier.h5')
```