```
import numpy as np
import pandas as pd
from sklearn.datasets import load_iris
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense
from tensorflow.keras.utils import to_categorical



# Load the Iris dataset
iris = load_iris()
X = iris.data
y = iris.target

# Standardize the features
scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)

# One-hot encode the target variable
y_categorical = to_categorical(y)

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X_scaled,
y_categorical, test_size=0.3, random_state=42)


# Build the Keras model
model = Sequential()
model.add(Dense(10, input_dim=4, activation='relu'))  # Input layer
with 4 features and a hidden layer with 10 neurons
model.add(Dense(10, activation='relu'))               # Another hidden
layer with 10 neurons
model.add(Dense(3, activation='softmax'))             # Output layer
with 3 neurons (for 3 classes)

# Compile the model
model.compile(optimizer='adam', loss='categorical_crossentropy',
metrics=['accuracy'])

# Train the model
model.fit(X_train, y_train, epochs=50, batch_size=5, verbose=1)

# history = model.fit(X_train, y_train, epochs=100, batch_size=5,
validation_split=0.2)

# Evaluate the model
loss, accuracy = model.evaluate(X_test, y_test)
print(f'Test accuracy: {accuracy:.4f}')
```

```
# Make predictions
predictions = model.predict(X_test)
predicted_classes = np.argmax(predictions, axis=1)
print(f'Predicted classes: {predicted_classes}')
```

```
Epoch 1/50
21/21 [==============================] - 1s 2ms/step - loss: 0.9729 -
accuracy: 0.4190
Epoch 2/50
21/21 [==============================] - 0s 2ms/step - loss: 0.9134 -
accuracy: 0.6571
Epoch 3/50
21/21 [==============================] - 0s 2ms/step - loss: 0.8579 -
accuracy: 0.7810
Epoch 4/50
21/21 [==============================] - 0s 2ms/step - loss: 0.8073 -
accuracy: 0.8000
Epoch 5/50
21/21 [==============================] - 0s 2ms/step - loss: 0.7589 -
accuracy: 0.8190
Epoch 6/50
21/21 [==============================] - 0s 2ms/step - loss: 0.7150 -
accuracy: 0.8476
Epoch 7/50
21/21 [==============================] - 0s 2ms/step - loss: 0.6747 -
accuracy: 0.8571
Epoch 8/50
21/21 [==============================] - 0s 2ms/step - loss: 0.6375 -
accuracy: 0.8571
Epoch 9/50
21/21 [==============================] - 0s 2ms/step - loss: 0.6016 -
accuracy: 0.8476
Epoch 10/50
21/21 [==============================] - 0s 2ms/step - loss: 0.5637 -
accuracy: 0.8286
Epoch 11/50
21/21 [==============================] - 0s 2ms/step - loss: 0.5234 -
accuracy: 0.8381
Epoch 12/50
21/21 [==============================] - 0s 2ms/step - loss: 0.4815 -
accuracy: 0.8476
Epoch 13/50
21/21 [==============================] - 0s 2ms/step - loss: 0.4447 -
accuracy: 0.8381
Epoch 14/50
21/21 [==============================] - 0s 2ms/step - loss: 0.4146 -
accuracy: 0.8286
Epoch 15/50
21/21 [==============================] - 0s 2ms/step - loss: 0.3917 -
accuracy: 0.8286
```

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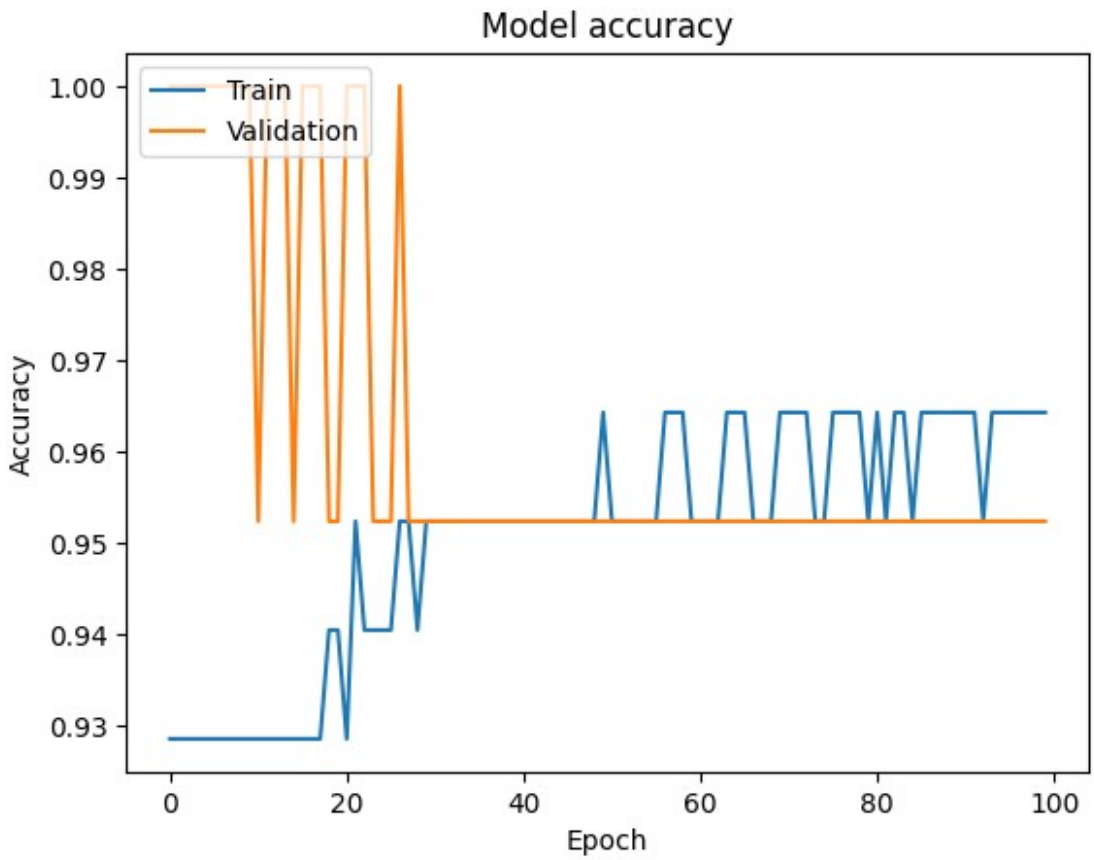
Epoch 16/50
21/21 [==============================] - 0s 2ms/step - loss: 0.3711 -
accuracy: 0.8381
Epoch 17/50
21/21 [==============================] - 0s 2ms/step - loss: 0.3550 -
accuracy: 0.8286
Epoch 18/50
21/21 [==============================] - 0s 2ms/step - loss: 0.3397 -
accuracy: 0.8381
Epoch 19/50
21/21 [==============================] - 0s 3ms/step - loss: 0.3268 -
accuracy: 0.8476
Epoch 20/50
21/21 [==============================] - 0s 2ms/step - loss: 0.3158 -
accuracy: 0.8476
Epoch 21/50
21/21 [==============================] - 0s 2ms/step - loss: 0.3064 -
accuracy: 0.8476
Epoch 22/50
21/21 [==============================] - 0s 2ms/step - loss: 0.2954 -
accuracy: 0.8476
Epoch 23/50
21/21 [==============================] - 0s 3ms/step - loss: 0.2870 -
accuracy: 0.8667
Epoch 24/50
21/21 [==============================] - 0s 2ms/step - loss: 0.2795 -
accuracy: 0.8762
Epoch 25/50
21/21 [==============================] - 0s 2ms/step - loss: 0.2723 -
accuracy: 0.8857
Epoch 26/50
21/21 [==============================] - 0s 2ms/step - loss: 0.2646 -
accuracy: 0.8762
Epoch 27/50
21/21 [==============================] - 0s 2ms/step - loss: 0.2567 -
accuracy: 0.8952
Epoch 28/50
21/21 [==============================] - 0s 2ms/step - loss: 0.2493 -
accuracy: 0.9048
Epoch 29/50
21/21 [==============================] - 0s 2ms/step - loss: 0.2423 -
accuracy: 0.9048
Epoch 30/50
21/21 [==============================] - 0s 2ms/step - loss: 0.2368 -
accuracy: 0.9048
Epoch 31/50
21/21 [==============================] - 0s 2ms/step - loss: 0.2312 -
accuracy: 0.9048
Epoch 32/50
```

```
21/21 [==============================] - 0s 2ms/step - loss: 0.2248 -
accuracy: 0.9143
Epoch 33/50
21/21 [==============================] - 0s 2ms/step - loss: 0.2194 -
accuracy: 0.9143
Epoch 34/50
21/21 [==============================] - 0s 2ms/step - loss: 0.2153 -
accuracy: 0.9143
Epoch 35/50
21/21 [==============================] - 0s 2ms/step - loss: 0.2090 -
accuracy: 0.9143
Epoch 36/50
21/21 [==============================] - 0s 2ms/step - loss: 0.2036 -
accuracy: 0.9238
Epoch 37/50
21/21 [==============================] - 0s 2ms/step - loss: 0.1996 -
accuracy: 0.9238
Epoch 38/50
21/21 [==============================] - 0s 3ms/step - loss: 0.1943 -
accuracy: 0.9238
Epoch 39/50
21/21 [==============================] - 0s 2ms/step - loss: 0.1901 -
accuracy: 0.9238
Epoch 40/50
21/21 [==============================] - 0s 2ms/step - loss: 0.1858 -
accuracy: 0.9333
Epoch 41/50
21/21 [==============================] - 0s 2ms/step - loss: 0.1831 -
accuracy: 0.9333
Epoch 42/50
21/21 [==============================] - 0s 2ms/step - loss: 0.1782 -
accuracy: 0.9238
Epoch 43/50
21/21 [==============================] - 0s 2ms/step - loss: 0.1753 -
accuracy: 0.9238
Epoch 44/50
21/21 [==============================] - 0s 2ms/step - loss: 0.1707 -
accuracy: 0.9429
Epoch 45/50
21/21 [==============================] - 0s 2ms/step - loss: 0.1676 -
accuracy: 0.9333
Epoch 46/50
21/21 [==============================] - 0s 2ms/step - loss: 0.1641 -
accuracy: 0.9333
Epoch 47/50
21/21 [==============================] - 0s 2ms/step - loss: 0.1610 -
accuracy: 0.9429
Epoch 48/50
21/21 [==============================] - 0s 2ms/step - loss: 0.1617 -
```

```
accuracy: 0.9238
Epoch 49/50
21/21 [==============================] - 0s 2ms/step - loss: 0.1568 -
accuracy: 0.9333
Epoch 50/50
21/21 [==============================] - 0s 2ms/step - loss: 0.1525 -
accuracy: 0.9429
2/2 [==============================] - 0s 8ms/step - loss: 0.1204 -
accuracy: 0.9778
Test accuracy: 0.9778
2/2 [==============================] - 0s 5ms/step
Predicted classes: [1 0 2 1 1 0 1 2 1 1 2 0 0 0 0 2 2 1 1 2 0 2 0 2 2
2 2 2 0 0 0 0 1 0 0 2 1
 0 0 0 2 1 1 0 0]
```

```
# Plot the accuracy
import matplotlib.pyplot as plt
plt.plot(history.history['accuracy'])
plt.plot(history.history['val_accuracy'])
plt.title('Model accuracy')
plt.ylabel('Accuracy')
plt.xlabel('Epoch')
plt.legend(['Train', 'Validation'], loc='upper left')
plt.show()
```




```
# save model
model.save('my_model.keras')
```