```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
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
```

```
df = pd.read_csv('/content/moonDataset.csv')
df.head()
```

	X1	X2	X3	label
0	-0.926767	-0.111073	0.086017	0
1	-0.917583	0.706006	0.058041	0
2	0.437984	0.899093	0.072543	0
3	0.089694	0.291446	0.070444	1
4	0.110672	-0.070806	-0.090376	1

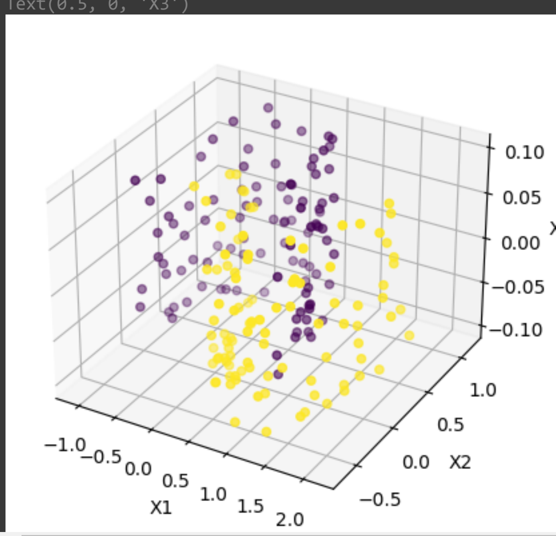
Next steps: Generate code with df   View recommended plots

```
df.shape
```

```
(200, 4)
```

```
data = np.loadtxt('//content/moonDataset.csv', delimiter=',', skiprows=1)
fig = plt.figure()
ax = fig.add_subplot(111, projection='3d')
ax.scatter(data[:, 0], data[:, 1], data[:, 2], c=data[:, 3])
ax.set_xlabel('X1')
ax.set_ylabel('X2')
ax.set_zlabel('X3')
```

```
Text(0.5, 0, 'X3')
```




```
# Extract features and labels
X = data[:, :3]
y = data[:, 3]
```

```
# Split data into train and test sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

```
# Scale features
scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)
```

```
# Build the neural network model
model = Sequential()
model.add(Dense(16, input_dim=3, activation='relu'))
model.add(Dense(8, activation='relu'))
model.add(Dense(1, activation='sigmoid'))  # Binary classification
```

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

```
# Train the model
model.fit(X_train, y_train, epochs=50, batch_size=32, verbose=1)
```

```
Epoch 1/50
5/5 [==============================] - 1s 8ms/step - loss: 0.6615 - accuracy: 0.5625
Epoch 2/50
5/5 [==============================] - 0s 5ms/step - loss: 0.6519 - accuracy: 0.5938
Epoch 3/50
5/5 [==============================] - 0s 4ms/step - loss: 0.6425 - accuracy: 0.6250
Epoch 4/50
5/5 [==============================] - 0s 4ms/step - loss: 0.6342 - accuracy: 0.6500
Epoch 5/50
5/5 [==============================] - 0s 6ms/step - loss: 0.6254 - accuracy: 0.6938
Epoch 6/50
5/5 [==============================] - 0s 5ms/step - loss: 0.6174 - accuracy: 0.7500
Epoch 7/50
5/5 [==============================] - 0s 4ms/step - loss: 0.6093 - accuracy: 0.7688
Epoch 8/50
5/5 [==============================] - 0s 4ms/step - loss: 0.6018 - accuracy: 0.7688
Epoch 9/50
5/5 [==============================] - 0s 5ms/step - loss: 0.5933 - accuracy: 0.8000
Epoch 10/50
5/5 [==============================] - 0s 4ms/step - loss: 0.5852 - accuracy: 0.8125
Epoch 11/50
5/5 [==============================] - 0s 4ms/step - loss: 0.5769 - accuracy: 0.8313
Epoch 12/50
5/5 [==============================] - 0s 4ms/step - loss: 0.5698 - accuracy: 0.8375
Epoch 13/50
5/5 [==============================] - 0s 4ms/step - loss: 0.5614 - accuracy: 0.8438
Epoch 14/50
5/5 [==============================] - 0s 4ms/step - loss: 0.5538 - accuracy: 0.8500
Epoch 15/50
5/5 [==============================] - 0s 4ms/step - loss: 0.5459 - accuracy: 0.8500
Epoch 16/50
5/5 [==============================] - 0s 4ms/step - loss: 0.5379 - accuracy: 0.8500
Epoch 17/50
5/5 [==============================] - 0s 4ms/step - loss: 0.5304 - accuracy: 0.8438
Epoch 18/50
5/5 [==============================] - 0s 4ms/step - loss: 0.5227 - accuracy: 0.8438
Epoch 19/50
5/5 [==============================] - 0s 5ms/step - loss: 0.5156 - accuracy: 0.8375
Epoch 20/50
5/5 [==============================] - 0s 4ms/step - loss: 0.5078 - accuracy: 0.8375
Epoch 21/50
5/5 [==============================] - 0s 4ms/step - loss: 0.5003 - accuracy: 0.8375
Epoch 22/50
5/5 [==============================] - 0s 4ms/step - loss: 0.4914 - accuracy: 0.8438
Epoch 23/50
5/5 [==============================] - 0s 4ms/step - loss: 0.4829 - accuracy: 0.8438
Epoch 24/50
5/5 [==============================] - 0s 5ms/step - loss: 0.4749 - accuracy: 0.8375
Epoch 25/50
5/5 [==============================] - 0s 5ms/step - loss: 0.4658 - accuracy: 0.8375
Epoch 26/50
5/5 [==============================] - 0s 6ms/step - loss: 0.4569 - accuracy: 0.8375
Epoch 27/50
5/5 [==============================] - 0s 5ms/step - loss: 0.4493 - accuracy: 0.8375
Epoch 28/50
5/5 [==============================] - 0s 6ms/step - loss: 0.4401 - accuracy: 0.8438
Epoch 29/50
5/5 [==============================] - 0s 5ms/step - loss: 0.4321 - accuracy: 0.8438
```

```
# Evaluate the model
_, accuracy = model.evaluate(X_test, y_test, verbose=0)
print('Accuracy: %.2f' % (accuracy*100))
```

```
Accuracy: 97.50
```