Developing a Neural Network Regression Model

AIM

To develop a neural network regression model for the given dataset.

THEORY

Explain the problem statement

Neural Network Model

Include the neural network model diagram.

DESIGN STEPS

STEP 1:

Loading the dataset

STEP 2:

Split the dataset into training and testing

STEP 3:

Create MinMaxScalar objects ,fit the model and transform the data.

STEP 4:

Build the Neural Network Model and compile the model.

STEP 5:

Train the model with the training data.

STEP 6:

Plot the performance plot

STEP 7:

Evaluate the model with the testing data.

PROGRAM

```
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```

```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import MinMaxScaler

from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense

from google.colab import auth
import gspread
from google.auth import default

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auth.authenticate_user()
creds, _ = default()
gc = gspread.authorize(creds)
worksheet = gc.open('Deeplearning').sheet1
data = worksheet.get_all_values()
dataset1 = pd.DataFrame(data[1:], columns=data[0])
dataset1 = dataset1.astype({'Input': 'int', 'Output': 'int'})
dataset1.head()

x = dataset1[['Input']].values
y = dataset1[['Output']].values

x_train,x_test,y_train,y_test = train_test_split(x,y,test_size=0.33,random_state

Scaler = MinMaxScaler()
Scaler.fit(x_train)
x_train1 = Scaler.transform(x_train)

ai_brain = Sequential([
    Dense(8,activation = 'relu'),
    Dense(10,activation = 'relu'),
    Dense(1)
])

ai_brain.compile(optimizer = 'rmsprop', loss = 'mse')
ai_brain.fit(x_train1,y_train,epochs = 1000)

loss_df = pd.DataFrame(ai_brain.history.history)
loss_df.plot()
x_test1 = Scaler.transform(x_test)
ai_brain.evaluate(x_test1,y_test)
x_n1=[[4]]
```

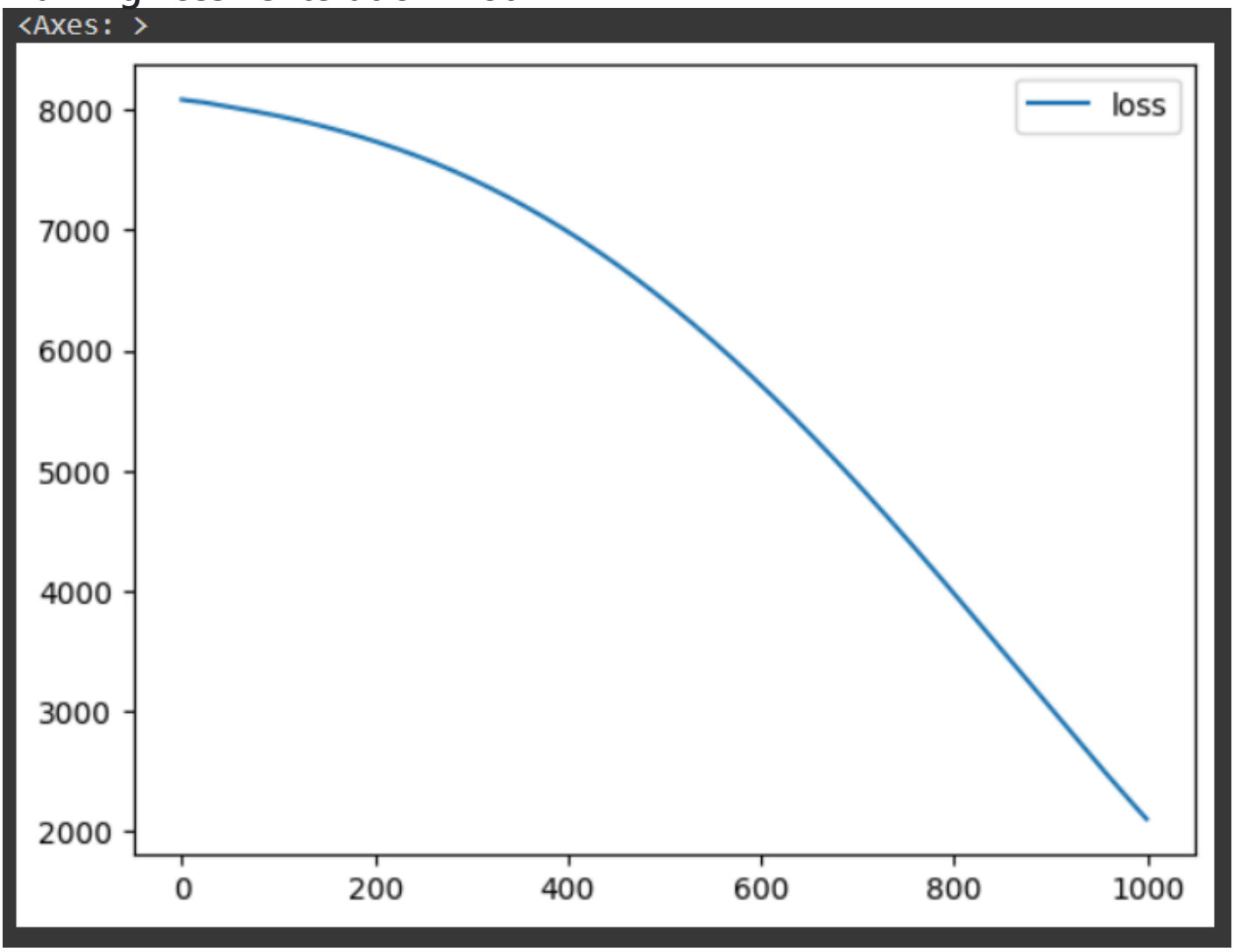
```
x_n1_1 = Scaler.transform(x_n1)
ai_brain.predict(x_n1_1)
```

OUTPUT:

Dataset Information

	Input	Output
0	1	90
1	2	91
2	3	92
3	4	85
4	5	87

Training Loss Vs Iteration Plot



Test Data Root Mean Squared Error

```
Epoch 1/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - loss: 8087.4819
Epoch 2/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 32ms/step - loss: 8085.8208
Epoch 3/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 25ms/step - loss: 8084.5146
Epoch 4/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 258ms/step - loss: 8083.4277
Epoch 5/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 27ms/step - loss: 8082.4604
Epoch 6/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 64ms/step - loss: 8081.5723
Epoch 7/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 28ms/step - loss: 8080.7104
Epoch 8/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 59ms/step - loss: 8079.8418
Epoch 9/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 29ms/step - loss: 8079.0063
Epoch 10/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 29ms/step - loss: 8078.1504
Epoch 11/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 30ms/step - loss: 8077.3037
Epoch 12/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 27ms/step - loss: 8076.4287
Epoch 13/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 27ms/step - loss: 8075.5859
Epoch 14/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 28ms/step - loss: 8074.7427
Epoch 15/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 29ms/step - loss: 8073.8198
Epoch 16/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 28ms/step - loss: 8072.8843
Epoch 17/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 29ms/step - loss: 8071.9785
Epoch 18/1000
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 290ms/step - loss: 1907.6912
1907.691162109375
```

New Sample Data Prediction

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 53ms/step
array([[37.734554]], dtype=float32)
```

RESULT:

Thus a Neural Network regression model for the given dataset is written and executed successfully