

Projekt AAI

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Predykcja ceny komórek

W tym projekcie zajmiemy się predykcją ceny komórek na podstawie ich danych technicznych. Dane są pobrane z serwisu [Kaggle](#). Dane są w repozytorium, by samemu je ściągnąć należy odkomentować poniższe linijki.

In [1]:

```
#!/pip install kaggle
#import kaggle.json token by hand
#!/mkdir ~/.kaggle/
#!/mv /content/kaggle.json ~/.kaggle/
```

In [2]:

```
#import kaggle
#kaggle.api.dataset_download_files(
#    'pratikgarai/mobile-phone-specifications-and-prices',
#    unzip=True)
```

1. Przygotowanie danych

Po pobraniu danych z serwisu wczytamy dane do zmiennej oraz pozbędziemy się zbędnych kolumn z nazwą modelu oraz ID.

In [3]:

```
import pandas as pd

data = pd.read_csv('ndtv_data_final.csv', delimiter=',')
DATA = data.drop(columns=["Unnamed: 0", "Name", "Model"])
DATA.head()
```

Out[3]:

	Brand	Battery capacity (mAh)	Screen size (inches)	Touchscreen	Resolution x	Resolution y	Processor	RAM (MB)	Internal storage (GB)	Rear camera	Front camera	Operating system
0	OnePlus	4085	6.67	Yes	1440	3120	8	12000	256.0	48.0	16.0	Android
1	Realme	4000	6.50	Yes	1080	2400	8	6000	64.0	64.0	16.0	Android
2	Apple	3969	6.50	Yes	1242	2688	6	4000	64.0	12.0	12.0	iOS
3	Apple	3110	6.10	Yes	828	1792	6	4000	64.0	12.0	12.0	iOS
4	LG	4000	6.40	Yes	1080	2340	8	6000	128.0	12.0	32.0	Android

Zanim będziemy korzystać z tych danych musimy jeszcze je odpowiednio spreparować. Dane w kolumnach 'Brand' i 'Operating system' będzie trzeba zamienić z ciągów znaków na wartości numeryczne. Każda unikalna wartość otrzyma swój numer.

In [4]:

```
text_cols = ['Brand', 'Operating system']
from sklearn.preprocessing import LabelEncoder
```

```
label_encoder = LabelEncoder()
for col in text_cols:
    DATA[col] = label_encoder.fit_transform(DATA[col].astype(str))
```

Będziemy także musieli zmienić ciągi znaków "Yes" i "No", na wartości 1 i 0.

```
In [5]:
```

```
bool_cols = ['Touchscreen', 'Wi-Fi', 'Bluetooth', 'GPS', '3G', '4G/ LTE']
for col in bool_cols:
    DATA[col] = DATA[col].map({"Yes": 1, "No": 0})
```

Poniżej przedstawione są dane po potrzebnych zmiennach:

```
In [6]:
```

```
DATA.head()
```

```
Out[6]:
```

	Brand	Battery capacity (mAh)	Screen size (inches)	Touchscreen	Resolution x	Resolution y	Processor	RAM (MB)	Internal storage (GB)	Rear camera	Front camera	Operating system	Warranty
0	44	4085	6.67	1	1440	3120	8	12000	256.0	48.0	16.0	0	
1	53	4000	6.50	1	1080	2400	8	6000	64.0	64.0	16.0	0	
2	3	3969	6.50	1	1242	2688	6	4000	64.0	12.0	12.0	6	
3	3	3110	6.10	1	828	1792	6	4000	64.0	12.0	12.0	6	
4	29	4000	6.40	1	1080	2340	8	6000	128.0	12.0	32.0	0	

Na koniec musimy podzielić dane na zbiory do trenowania i testowania

```
In [7]:
```

```
from sklearn.model_selection import train_test_split

X = DATA.drop('Price', axis=1)
y = DATA['Price']

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

2. Proste modele

Zacniemy od predykcji korzystając z pięciu prostych modeli z biblioteki 'sklearn'. Będą to:

- Drzewa decyzyjne
- K najbliższych sąsiadów
- Naiwny klasyfikator bayesowski
- Las losowy
- Gradient boosting

```
In [8]:
```

```
from sklearn.tree import DecisionTreeRegressor
from sklearn.neighbors import KNeighborsRegressor
from sklearn.naive_bayes import GaussianNB
from sklearn.ensemble import RandomForestRegressor, GradientBoostingRegressor
from sklearn.metrics import mean_squared_error, r2_score
import matplotlib.pyplot as plt

# Initialize the models
```

```

decision_tree_model = DecisionTreeRegressor()
knn_model = KNeighborsRegressor()
naive_bayes_model = GaussianNB()
random_forest_model = RandomForestRegressor()
gradient_boosting_model = GradientBoostingRegressor()

# Train the models
decision_tree_model.fit(X_train, y_train)
knn_model.fit(X_train, y_train)
naive_bayes_model.fit(X_train, y_train)
random_forest_model.fit(X_train, y_train)
gradient_boosting_model.fit(X_train, y_train)

# Make predictions
decision_tree_predictions = decision_tree_model.predict(X_test)
knn_predictions = knn_model.predict(X_test)
naive_bayes_predictions = naive_bayes_model.predict(X_test)
random_forest_predictions = random_forest_model.predict(X_test)
gradient_boosting_predictions = gradient_boosting_model.predict(X_test)

```

Po uczeniu modeli czas je ocenić, użyjemy do tego błędu średniokwadratowego (RMSE) oraz współczynnika determinacji (R^2):

In [9]:

```

# Calculate RMSE for each model
decision_tree_rmse = mean_squared_error(y_test, decision_tree_predictions, squared=False)
knn_rmse = mean_squared_error(y_test, knn_predictions, squared=False)
naive_bayes_rmse = mean_squared_error(y_test, naive_bayes_predictions, squared=False)
random_forest_rmse = mean_squared_error(y_test, random_forest_predictions, squared=False)
gradient_boosting_rmse = mean_squared_error(y_test, gradient_boosting_predictions, squared=False)

# Calculate R-squared for each model
decision_tree_r2 = r2_score(y_test, decision_tree_predictions)
knn_r2 = r2_score(y_test, knn_predictions)
naive_bayes_r2 = r2_score(y_test, naive_bayes_predictions)
random_forest_r2 = r2_score(y_test, random_forest_predictions)
gradient_boosting_r2 = r2_score(y_test, gradient_boosting_predictions)

```

In [11]:

```

import numpy as np
from sklearn.model_selection import learning_curve, cross_val_score

# Learning curves
def plot_learning_curve(estimator, title, X, y, cv, train_sizes=np.linspace(.1, 1.0, 5))
:
    train_sizes, train_scores, test_scores = learning_curve(estimator, X, y, cv=cv, train_sizes=train_sizes)
    train_scores_mean = np.mean(train_scores, axis=1)
    train_scores_std = np.std(train_scores, axis=1)
    test_scores_mean = np.mean(test_scores, axis=1)
    test_scores_std = np.std(test_scores, axis=1)

    plt.figure()
    plt.title(title)
    plt.xlabel("Training examples")
    plt.ylabel("Score")
    plt.grid()
    plt.fill_between(train_sizes, train_scores_mean - train_scores_std, train_scores_mean + train_scores_std, alpha=0.1, color="r")
    plt.fill_between(train_sizes, test_scores_mean - test_scores_std, test_scores_mean + test_scores_std, alpha=0.1, color="g")
    plt.plot(train_sizes, train_scores_mean, 'o-', color="r", label="Training score")
    plt.plot(train_sizes, test_scores_mean, 'o-', color="g", label="Cross-validation score")
    plt.legend(loc="best")
    return plt

```

```

# Metrics and cross-validation
def evaluate_model(estimator, X, y, cv):
    # Calculate metrics
    predictions = estimator.predict(X)
    rmse = mean_squared_error(y, predictions, squared=False)
    r2 = r2_score(y, predictions)

    # Perform cross-validation
    scores = cross_val_score(estimator, X, y, cv=cv, scoring='neg_mean_squared_error')
    cv_rmse = np.sqrt(-scores)
    cv_r2 = cross_val_score(estimator, X, y, cv=cv, scoring='r2')

    return rmse, r2, cv_rmse, cv_r2

# Define the models
models = {
    'Decision Tree': decision_tree_model,
    'K-Nearest Neighbors': knn_model,
    'Naive Bayes': naive_bayes_model,
    'Random Forest': random_forest_model,
    'Gradient Boosting': gradient_boosting_model
}

# Initialize lists to store results
learning_curve_plots = []
metrics = {}
cross_val_results = {}

# Evaluate each model
for name, model in models.items():
    # Learning curves
    plot = plot_learning_curve(model, f"{name} Learning Curve", X_train, y_train, cv=5)
    learning_curve_plots.append(plot)

    # Metrics and cross-validation
    rmse, r2, cv_rmse, cv_r2 = evaluate_model(model, X_test, y_test, cv=5)
    metrics[name] = {'RMSE': rmse, 'R-squared': r2}
    cross_val_results[name] = {'RMSE': cv_rmse, 'R-squared': cv_r2}

# Show learning curves
for plot in learning_curve_plots:
    plot.show()

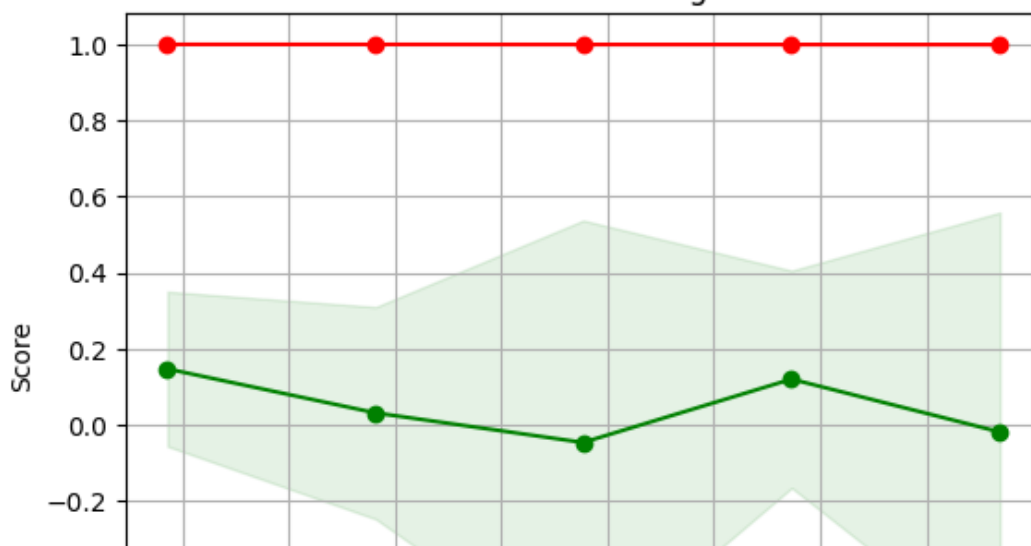
```

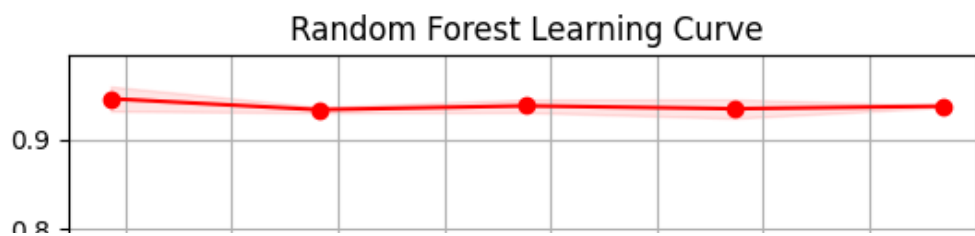
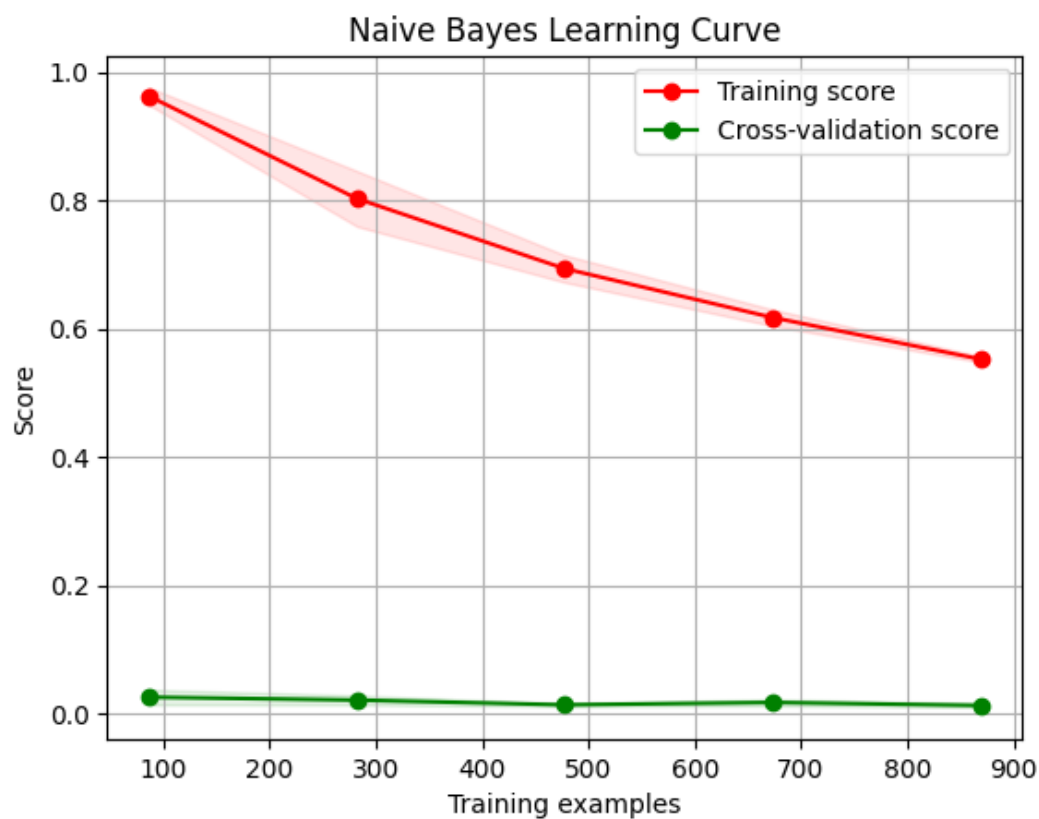
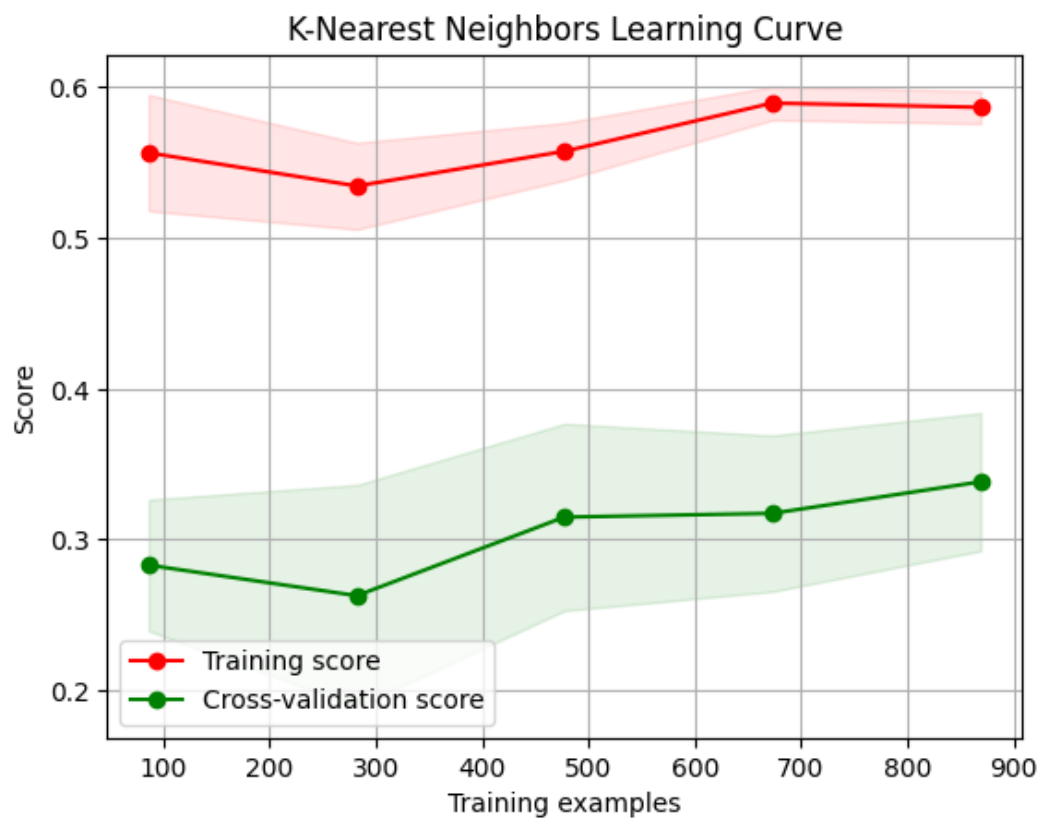
```

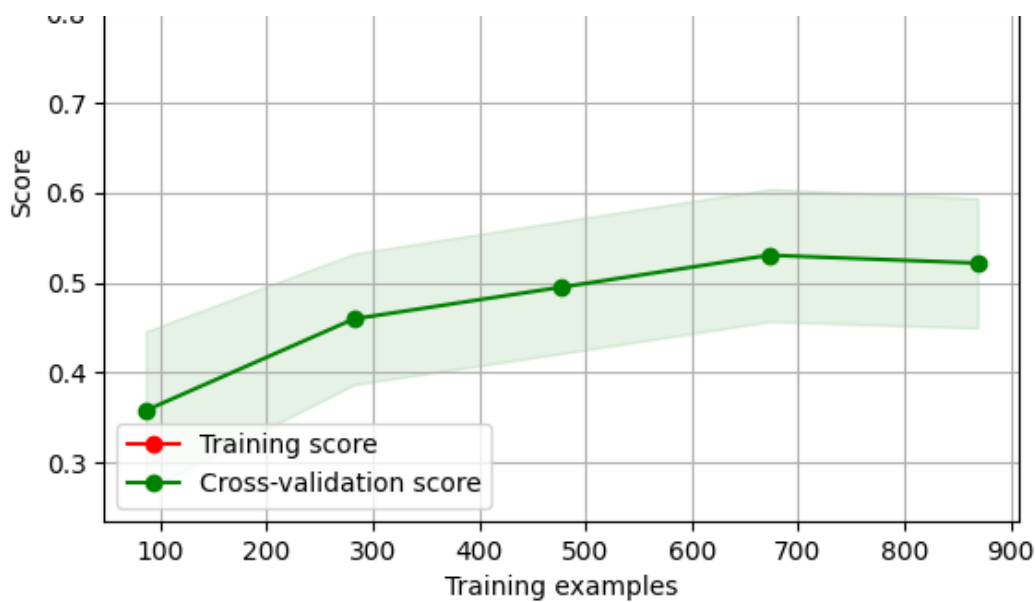
/usr/local/lib/python3.10/dist-packages/sklearn/model_selection/_split.py:700: UserWarning:
The least populated class in y has only 1 members, which is less than n_splits=5.
  warnings.warn(
/usr/local/lib/python3.10/dist-packages/sklearn/model_selection/_split.py:700: UserWarning:
The least populated class in y has only 1 members, which is less than n_splits=5.
  warnings.warn(
/usr/local/lib/python3.10/dist-packages/sklearn/model_selection/_split.py:700: UserWarning:
The least populated class in y has only 1 members, which is less than n_splits=5.
  warnings.warn(

```

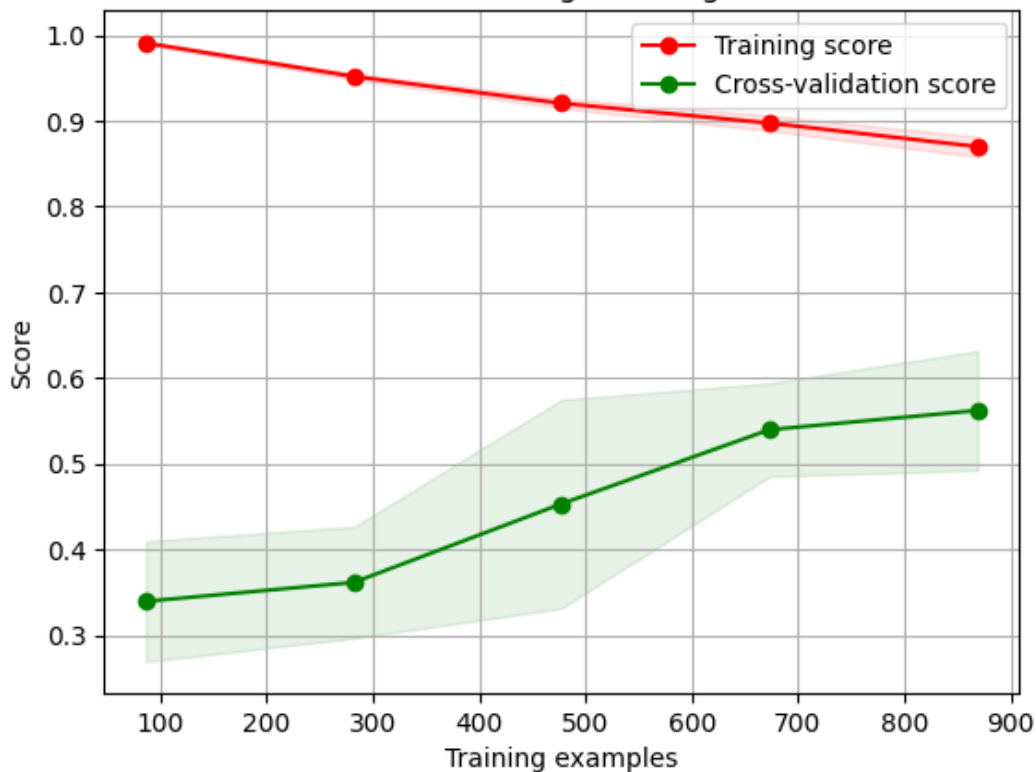
Decision Tree Learning Curve







Gradient Boosting Learning Curve



In [12]:

```
# Print metrics and cross-validation results
for name, metric_values in metrics.items():
    print(f"{name}:")
    print(f"    RMSE: {metric_values['RMSE']}")
    print(f"    R-squared: {metric_values['R-squared']}\n")

for name, cv_results in cross_val_results.items():
    print(f"{name} Cross-Validation:")
    print(f"    RMSE: {np.mean(cv_results['RMSE'])} (+/- {np.std(cv_results['RMSE'])})")
    print(f"    R-squared: {np.mean(cv_results['R-squared'])} (+/- {np.std(cv_results['R-squared'])})\n")
```

Decision Tree:

RMSE: 11705.9896014312
R-squared: 0.4801394751051944

K-Nearest Neighbors:

RMSE: 11501.259905638983
R-squared: 0.49816446731034036

Naive Bayes:

RMSE: 12850.980141865353

```

RMSE: 12050.30014100333
R-squared: 0.37346825887778834

Random Forest:
RMSE: 9313.649562570798
R-squared: 0.6709132784982622

Gradient Boosting:
RMSE: 9594.477733848362
R-squared: 0.6507686268224104

Decision Tree Cross-Validation:
RMSE: 11951.138021974413 (+/- 4663.408760233281)
R-squared: -0.02611878588523746 (+/- 0.8988734216849495)

K-Nearest Neighbors Cross-Validation:
RMSE: 11853.89391522688 (+/- 4925.797169631719)
R-squared: 0.276769915266699 (+/- 0.2067750618011011)

Naive Bayes Cross-Validation:
RMSE: 12998.23197589786 (+/- 7444.62301872397)
R-squared: 0.10626639770612303 (+/- 0.2178608365082816)

Random Forest Cross-Validation:
RMSE: 9984.054360730583 (+/- 5242.073685345682)
R-squared: 0.5057589793766637 (+/- 0.1013977091119237)

Gradient Boosting Cross-Validation:
RMSE: 9852.479565595955 (+/- 4724.218654112794)
R-squared: 0.4911879926345536 (+/- 0.13102298729621978)

```

In [13]:

```

import numpy as np

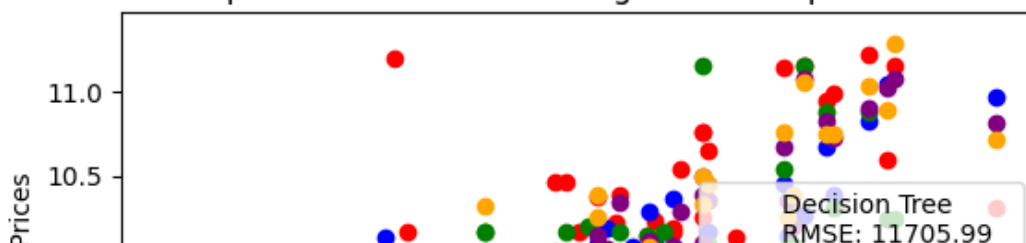
# Apply logarithmic transformation to the actual prices and predicted prices
y_test_log = np.loglp(y_test)
decision_tree_predictions_log = np.loglp(decision_tree_predictions)
knn_predictions_log = np.loglp(knn_predictions)
naive_bayes_predictions_log = np.loglp(naive_bayes_predictions)
random_forest_predictions_log = np.loglp(random_forest_predictions)
gradient_boosting_predictions_log = np.loglp(gradient_boosting_predictions)

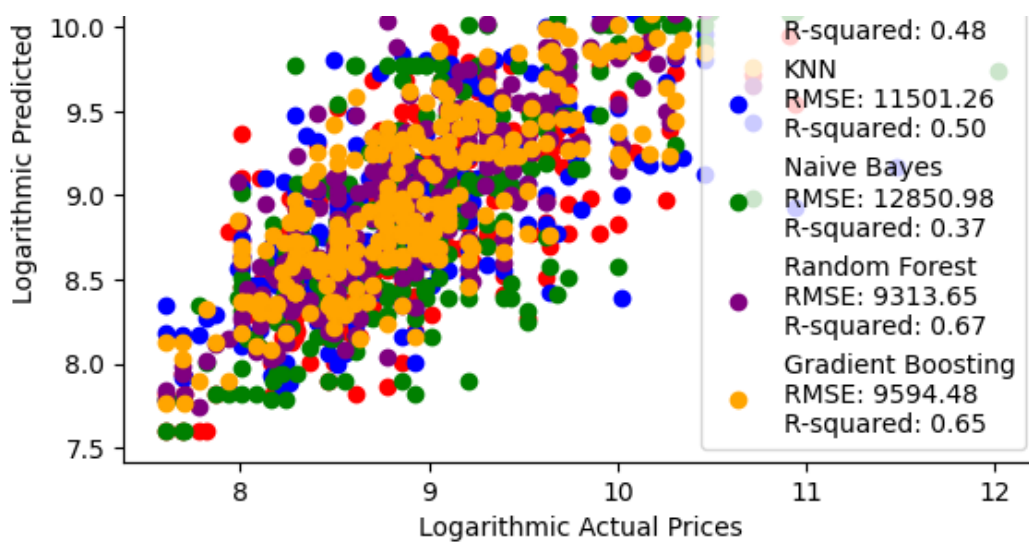
# Plotting the logarithmic predictions
plt.scatter(y_test_log, decision_tree_predictions_log, color='red', label=f"Decision Tree\nRMSE: {decision_tree_rmse:.2f}\nR-squared: {decision_tree_r2:.2f}")
plt.scatter(y_test_log, knn_predictions_log, color='blue', label=f"KNN\nRMSE: {knn_rmse:.2f}\nR-squared: {knn_r2:.2f}")
plt.scatter(y_test_log, naive_bayes_predictions_log, color='green', label=f"Naive Bayes\nRMSE: {naive_bayes_rmse:.2f}\nR-squared: {naive_bayes_r2:.2f}")
plt.scatter(y_test_log, random_forest_predictions_log, color='purple', label=f"Random Forest\nRMSE: {random_forest_rmse:.2f}\nR-squared: {random_forest_r2:.2f}")
plt.scatter(y_test_log, gradient_boosting_predictions_log, color='orange', label=f"Gradient Boosting\nRMSE: {gradient_boosting_rmse:.2f}\nR-squared: {gradient_boosting_r2:.2f}")

# Plot settings
plt.xlabel('Logarithmic Actual Prices')
plt.ylabel('Logarithmic Predicted Prices')
plt.title('Comparison of Predictions: Logarithmic Representation')
plt.legend()
plt.show()

```

Comparison of Predictions: Logarithmic Representation



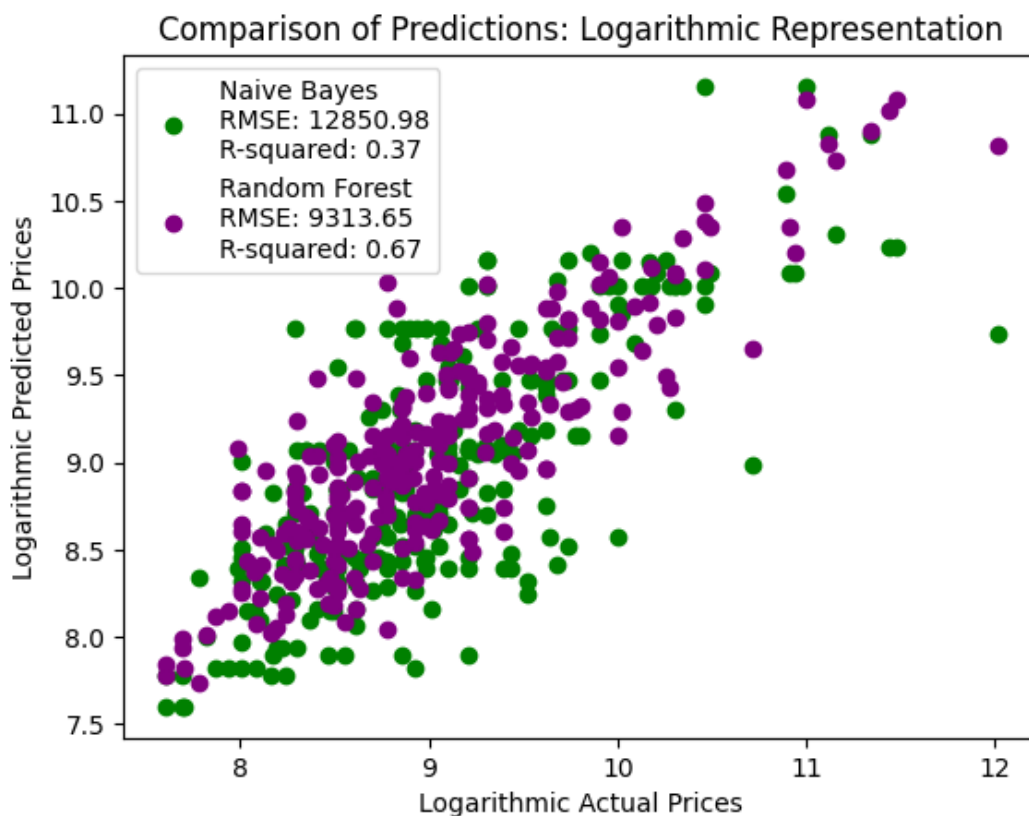


Widzimy że najlepszym modelem jest 'Random Forest' z dokładnością 67% a zaraz za nim 'Gradient Boosting' z 66%. Zobaczmy jeszcze porównanie najgorszego i najlepszego modelu.

In [14]:

```
# Plotting the logarithmic predictions
plt.scatter(y_test_log, naive_bayes_predictions_log, color='green', label=f"Naive Bayes\
nRMSE: {naive_bayes_rmse:.2f}\nR-squared: {naive_bayes_r2:.2f}")
plt.scatter(y_test_log, random_forest_predictions_log, color='purple', label=f"Random For
est\nRMSE: {random_forest_rmse:.2f}\nR-squared: {random_forest_r2:.2f}")

# Plot settings
plt.xlabel('Logarithmic Actual Prices')
plt.ylabel('Logarithmic Predicted Prices')
plt.title('Comparison of Predictions: Logarithmic Representation')
plt.legend()
plt.show()
```



3. Zaawansowany model

Po napisaniu i sprawdzeniu prostych modeli, czas napisać kolejny przy użyciu PyTorch. Zaczniemy jednak od przygotowania danych.

In [15]:

```
from sklearn.preprocessing import StandardScaler, OneHotEncoder

# Separate the categorical features
categorical_features = X[['Brand', 'Operating system']]

# One-hot encode the categorical features
encoder = OneHotEncoder(sparse=False)
categorical_features_encoded = encoder.fit_transform(categorical_features)

# Normalize the numerical features
numerical_features = X.drop(['Brand', 'Operating system'], axis=1).values
scaler = StandardScaler()
numerical_features_scaled = scaler.fit_transform(numerical_features)

# Concatenate the encoded categorical features and the scaled numerical features
X_scaled = np.concatenate((numerical_features_scaled, categorical_features_encoded), axis=1)

/usr/local/lib/python3.10/dist-packages/sklearn/preprocessing/_encoders.py:868: FutureWarning: `sparse` was renamed to `sparse_output` in version 1.2 and will be removed in 1.4. `sparse_output` is ignored unless you leave `sparse` to its default value.
  warnings.warn(
```

Następnie czas stworzyć model. Będziemy korzystać z 3 warstw full connected. Po każdej warstwie używana jest funkcja aktywacji ReLU.

Wybraliśmy 3 warstwy ponieważ są one w stanie nauczyć się nieliniowych zależności pomiędzy cechami i ekstrahować istotne cechy w procesie predykcji. Taka architektura jest prosta i uniwersalna. Pozwala ona rozwiązywać wiele problemów, a ponieważ nie mamy bardzo dużej ilości danych oraz cech, uczenie wykonuje się szybko i daje dobre efekty.

Używamy funkcji aktywacji ReLU (Rectified Linear Unit) po każdej warstwie ponieważ, pomaga on w rozpraszaniu gradientów podczas propagacji wstecznej co przyspiesza to proces uczenia się. Dzięki niemu także unikamy zjawiska zanikającego gradientu, który występuje w niektórych innych funkcjach aktywacji, takich jak sigmoida. Dzięki temu, informacje o gradientach mogą swobodnie przepływać wstecz przy backpropagation. Jest to także najczęściej używana funkcja aktywacji na zajęciach więc zakładam iż jest ona najlepsza :)

Do obliczania jak bardzo predykcje różnią się od oczekiwanych wartości korzystamy z MSE - Mean Squared Error. Wybraliśmy go ponieważ chcemy przewidzieć cenę komórki która jest wartością liczbową.

Jako optymalizator (odpowiedzialny za aktualizację wag modelu w celu minimalizacji funkcji straty) wybraliśmy ADAM z powodu jego popularności. Jest on często wykorzystywany i dobrze sprawdzał się wielu innych modelach. Learning rate będzie wynosił 0.001, gdyż pomoże osiągnąć bardziej stabilne wagi, a wzrost w czasie uczenia dla danych takich rozmiarów, znacznie się nie zwiększy.

In [16]:

```
import torch
import torch.nn as nn
import torch.optim as optim
from torch.utils.data import TensorDataset, DataLoader

# Convert X_scaled and y to PyTorch tensors
X_tensor = torch.tensor(X_scaled, dtype=torch.float32)
y_tensor = torch.tensor(y.values, dtype=torch.float32)

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X_tensor, y_tensor, test_size=0.2, random_state=42)

# Define the neural network model
class MobilePricePredictionModel(nn.Module):
    def __init__(self, input_size):
        super(MobilePricePredictionModel, self).__init__()
        self.fc1 = nn.Linear(input_size, 64)
        self.relu = nn.ReLU()
```

```

        self.fc2 = nn.Linear(64, 32)
        self.fc3 = nn.Linear(32, 1)

    def forward(self, x):
        x = self.fc1(x)
        x = self.relu(x)
        x = self.fc2(x)
        x = self.relu(x)
        x = self.fc3(x)
        return x

# Instantiate the model
input_size = X_train.shape[1]
model = MobilePricePredictionModel(input_size)

# Define the loss function and optimizer
criterion = nn.MSELoss()
optimizer = optim.Adam(model.parameters(), lr=0.001)

# Create the dataloaders
batch_size = 32
train_dataset = TensorDataset(X_train, y_train)
train_dataloader = DataLoader(train_dataset, batch_size=batch_size, shuffle=True)

```

Po definicji modelu czas go uruchomić i nauczyć. Model będzie się uczyć przez 1000 epok.

In [17]:

```

# Initialize variables to store RMSE and R-squared values
nn_rmse = []
nn_r2 = []
num_epochs = 1000
train_losses = []
test_losses = []

model.train()
for epoch in range(num_epochs):
    running_loss = 0.0

    for batch_features, batch_targets in train_dataloader:
        optimizer.zero_grad()
        outputs = model(batch_features)
        loss = criterion(outputs, batch_targets.unsqueeze(1))
        loss.backward()
        optimizer.step()
        running_loss += loss.item() * batch_features.size(0)

    epoch_loss = running_loss / len(train_dataset)
    train_losses.append(epoch_loss)

    model.eval()
    with torch.no_grad():
        y_pred_train = model(X_train)
        train_loss = criterion(y_pred_train, y_train.unsqueeze(1))

        y_pred_test = model(X_test)
        test_loss = criterion(y_pred_test, y_test.unsqueeze(1))
        predictions = y_pred_test.squeeze().tolist()

        nn_rmse.append(mean_squared_error(y_test, predictions, squared=False))
        nn_r2.append(r2_score(y_test, predictions))

    test_losses.append(test_loss.item())

    print(f"Epoch {epoch+1} - Training Loss: {train_loss.item()}, Testing Loss: {test_loss.item()}")
    print(f"Epoch {epoch+1} - RMSE: {nn_rmse[-1]}, R-squared: {nn_r2[-1]}")

```

```

Epoch 1 - Training Loss: 302488992.0, Testing Loss: 406600864.0
Epoch 1 - RMSE: 20164.346599059296, R-squared: -0.5425486458368891
Epoch 2 - Training Loss: 302346624.0, Testing Loss: 406445792.0
Epoch 2 - RMSE: 20160.400073114404, R-squared: -0.5410001600117311

```

Epoch 2 - RMSE: 20160.499873114404, R-squared: -0.5419601620117311
Epoch 3 - Training Loss: 301845376.0, Testing Loss: 405901632.0
Epoch 3 - RMSE: 20147.00162932197, R-squared: -0.5398960478772161
Epoch 4 - Training Loss: 300685376.0, Testing Loss: 404640640.0
Epoch 4 - RMSE: 20115.681566750238, R-squared: -0.5351119958263453
Epoch 5 - Training Loss: 298505760.0, Testing Loss: 402275008.0
Epoch 5 - RMSE: 20056.79602326432, R-squared: -0.5261375453331576
Epoch 6 - Training Loss: 294892320.0, Testing Loss: 398335744.0
Epoch 6 - RMSE: 19958.35069522441, R-squared: -0.5111927460936019
Epoch 7 - Training Loss: 289472256.0, Testing Loss: 392411552.0
Epoch 7 - RMSE: 19809.379069476447, R-squared: -0.48871747610286875
Epoch 8 - Training Loss: 282327744.0, Testing Loss: 384572160.0
Epoch 8 - RMSE: 19610.510839150786, R-squared: -0.4589767630094277
Epoch 9 - Training Loss: 273185504.0, Testing Loss: 374482592.0
Epoch 9 - RMSE: 19351.55290849657, R-squared: -0.42069942477487077
Epoch 10 - Training Loss: 262332320.0, Testing Loss: 362401024.0
Epoch 10 - RMSE: 19036.832568519832, R-squared: -0.37486463749723953
Epoch 11 - Training Loss: 249115600.0, Testing Loss: 347558720.0
Epoch 11 - RMSE: 18642.92778294076, R-squared: -0.3185566571539509
Epoch 12 - Training Loss: 235181344.0, Testing Loss: 331706208.0
Epoch 12 - RMSE: 18212.8040407038, R-squared: -0.2584158827376464
Epoch 13 - Training Loss: 219420640.0, Testing Loss: 313496224.0
Epoch 13 - RMSE: 17705.824715707357, R-squared: -0.18933139230108598
Epoch 14 - Training Loss: 203390256.0, Testing Loss: 294584992.0
Epoch 14 - RMSE: 17163.47845491287, R-squared: -0.1175865839158674
Epoch 15 - Training Loss: 187159392.0, Testing Loss: 274904832.0
Epoch 15 - RMSE: 16580.253443272744, R-squared: -0.04292455053194355
Epoch 16 - Training Loss: 172665232.0, Testing Loss: 256746592.0
Epoch 16 - RMSE: 16023.314605798734, R-squared: 0.025963389146659188
Epoch 17 - Training Loss: 159059776.0, Testing Loss: 239001824.0
Epoch 17 - RMSE: 15459.683849790108, R-squared: 0.09328295907819095
Epoch 18 - Training Loss: 147776720.0, Testing Loss: 223566272.0
Epoch 18 - RMSE: 14952.133157202179, R-squared: 0.15184178417268201
Epoch 19 - Training Loss: 137949424.0, Testing Loss: 209225008.0
Epoch 19 - RMSE: 14464.61216078053, R-squared: 0.2062492510431999
Epoch 20 - Training Loss: 130464704.0, Testing Loss: 197520288.0
Epoch 20 - RMSE: 14054.191521747469, R-squared: 0.2506541674789261
Epoch 21 - Training Loss: 124545528.0, Testing Loss: 187445392.0
Epoch 21 - RMSE: 13691.069993543166, R-squared: 0.2888759891039414
Epoch 22 - Training Loss: 120560344.0, Testing Loss: 180121824.0
Epoch 22 - RMSE: 13420.947629271264, R-squared: 0.316659872115822
Epoch 23 - Training Loss: 117286064.0, Testing Loss: 173481632.0
Epoch 23 - RMSE: 13171.242614273657, R-squared: 0.34185125072115274
Epoch 24 - Training Loss: 114766800.0, Testing Loss: 167991088.0
Epoch 24 - RMSE: 12961.137436787178, R-squared: 0.3626811073858338
Epoch 25 - Training Loss: 113005848.0, Testing Loss: 163979920.0
Epoch 25 - RMSE: 12805.465218317187, R-squared: 0.3778984506078972
Epoch 26 - Training Loss: 111582024.0, Testing Loss: 160476672.0
Epoch 26 - RMSE: 12667.93891968942, R-squared: 0.39118901125711947
Epoch 27 - Training Loss: 110461976.0, Testing Loss: 158075248.0
Epoch 27 - RMSE: 12572.797611786085, R-squared: 0.4002995005529426
Epoch 28 - Training Loss: 109254888.0, Testing Loss: 154655712.0
Epoch 28 - RMSE: 12436.065537076121, R-squared: 0.41327233616714565
Epoch 29 - Training Loss: 108384144.0, Testing Loss: 153229600.0
Epoch 29 - RMSE: 12378.59458138229, R-squared: 0.41868271046795913
Epoch 30 - Training Loss: 107508552.0, Testing Loss: 151287584.0
Epoch 30 - RMSE: 12299.901936925664, R-squared: 0.42605026567775606
Epoch 31 - Training Loss: 106753488.0, Testing Loss: 150112800.0
Epoch 31 - RMSE: 12252.053469623286, R-squared: 0.4305070814127434
Epoch 32 - Training Loss: 106031840.0, Testing Loss: 148787744.0
Epoch 32 - RMSE: 12197.858906223802, R-squared: 0.4355340201223442
Epoch 33 - Training Loss: 105215928.0, Testing Loss: 147021216.0
Epoch 33 - RMSE: 12125.230288542054, R-squared: 0.4422359066771454
Epoch 34 - Training Loss: 104558832.0, Testing Loss: 146255840.0
Epoch 34 - RMSE: 12093.62814736031, R-squared: 0.44513953309375265
Epoch 35 - Training Loss: 103890648.0, Testing Loss: 145146240.0
Epoch 35 - RMSE: 12047.665717723918, R-squared: 0.4493490676779588
Epoch 36 - Training Loss: 103167632.0, Testing Loss: 143056384.0
Epoch 36 - RMSE: 11960.617655915055, R-squared: 0.45727756302062206
Epoch 37 - Training Loss: 102568064.0, Testing Loss: 142568880.0
Epoch 37 - RMSE: 11940.222257164096, R-squared: 0.459126899450641
Epoch 38 - Training Loss: 101941008.0, Testing Loss: 141442704.0
Epoch 38 - RMSE: 11922.666666666667, R-squared: 0.4622222222222222

Epoch 38 - RMSE: 11892.968961333654, R-squared: 0.4633994269222055
Epoch 39 - Training Loss: 101336080.0, Testing Loss: 140428880.0
Epoch 39 - RMSE: 11850.269633209358, R-squared: 0.4672456242289914
Epoch 40 - Training Loss: 100758280.0, Testing Loss: 139545328.0
Epoch 40 - RMSE: 11812.931252218674, R-squared: 0.4705975896878889
Epoch 41 - Training Loss: 100186080.0, Testing Loss: 138252480.0
Epoch 41 - RMSE: 11758.081580028036, R-squared: 0.4755024070665832
Epoch 42 - Training Loss: 99570680.0, Testing Loss: 136702848.0
Epoch 42 - RMSE: 11691.999837502013, R-squared: 0.48138131153006913
Epoch 43 - Training Loss: 99043504.0, Testing Loss: 136371504.0
Epoch 43 - RMSE: 11677.821419252276, R-squared: 0.4826383649544259
Epoch 44 - Training Loss: 98524688.0, Testing Loss: 135345024.0
Epoch 44 - RMSE: 11633.788699672812, R-squared: 0.4865325657553168
Epoch 45 - Training Loss: 98028504.0, Testing Loss: 134808256.0
Epoch 45 - RMSE: 11610.696366595652, R-squared: 0.48856894332158685
Epoch 46 - Training Loss: 97539328.0, Testing Loss: 133880504.0
Epoch 46 - RMSE: 11570.673898822497, R-squared: 0.49208870718886055
Epoch 47 - Training Loss: 97011928.0, Testing Loss: 132447696.0
Epoch 47 - RMSE: 11508.592531688575, R-squared: 0.497524386593876
Epoch 48 - Training Loss: 96529272.0, Testing Loss: 131627040.0
Epoch 48 - RMSE: 11472.882803488406, R-squared: 0.5006377872414673
Epoch 49 - Training Loss: 96073576.0, Testing Loss: 131271048.0
Epoch 49 - RMSE: 11457.357507658298, R-squared: 0.5019883633154473
Epoch 50 - Training Loss: 95641792.0, Testing Loss: 130407336.0
Epoch 50 - RMSE: 11419.602604953967, R-squared: 0.5052651051935038
Epoch 51 - Training Loss: 95148456.0, Testing Loss: 129018320.0
Epoch 51 - RMSE: 11358.622976835195, R-squared: 0.5105346757325131
Epoch 52 - Training Loss: 94740816.0, Testing Loss: 128591552.0
Epoch 52 - RMSE: 11339.822003263513, R-squared: 0.5121536763181812
Epoch 53 - Training Loss: 94281688.0, Testing Loss: 127952128.0
Epoch 53 - RMSE: 11311.592809238266, R-squared: 0.5145795287207262
Epoch 54 - Training Loss: 93833736.0, Testing Loss: 126649976.0
Epoch 54 - RMSE: 11253.887832251216, R-squared: 0.5195195454742153
Epoch 55 - Training Loss: 93429256.0, Testing Loss: 126136336.0
Epoch 55 - RMSE: 11231.043905021046, R-squared: 0.5214681912604806
Epoch 56 - Training Loss: 93050952.0, Testing Loss: 125591288.0
Epoch 56 - RMSE: 11206.752178586252, R-squared: 0.5235359941585305
Epoch 57 - Training Loss: 92625432.0, Testing Loss: 124614624.0
Epoch 57 - RMSE: 11163.092187207094, R-squared: 0.5272412412023911
Epoch 58 - Training Loss: 92234928.0, Testing Loss: 123830016.0
Epoch 58 - RMSE: 11127.894038978846, R-squared: 0.5302178356043719
Epoch 59 - Training Loss: 91845544.0, Testing Loss: 123444392.0
Epoch 59 - RMSE: 11110.553057492703, R-squared: 0.5316808503155639
Epoch 60 - Training Loss: 91468880.0, Testing Loss: 122676160.0
Epoch 60 - RMSE: 11075.927138117493, R-squared: 0.5345953249721339
Epoch 61 - Training Loss: 91109000.0, Testing Loss: 122174496.0
Epoch 61 - RMSE: 11053.257273107545, R-squared: 0.536498527050483
Epoch 62 - Training Loss: 90689008.0, Testing Loss: 120721328.0
Epoch 62 - RMSE: 10987.325594313526, R-squared: 0.5420115242358554
Epoch 63 - Training Loss: 90374648.0, Testing Loss: 120493400.0
Epoch 63 - RMSE: 10976.94885105578, R-squared: 0.5428761904592523
Epoch 64 - Training Loss: 89973104.0, Testing Loss: 119347264.0
Epoch 64 - RMSE: 10924.617280132179, R-squared: 0.5472243903870544
Epoch 65 - Training Loss: 89612312.0, Testing Loss: 118545056.0
Epoch 65 - RMSE: 10887.839749590583, R-squared: 0.5502677811266565
Epoch 66 - Training Loss: 89243768.0, Testing Loss: 117857368.0
Epoch 66 - RMSE: 10856.21296523431, R-squared: 0.5528767331385522
Epoch 67 - Training Loss: 88931136.0, Testing Loss: 117697728.0
Epoch 67 - RMSE: 10848.858133756998, R-squared: 0.5534823591227291
Epoch 68 - Training Loss: 88581312.0, Testing Loss: 116864760.0
Epoch 68 - RMSE: 10810.400499487318, R-squared: 0.5566424291993735
Epoch 69 - Training Loss: 88257032.0, Testing Loss: 116119936.0
Epoch 69 - RMSE: 10775.896033631747, R-squared: 0.5594681159072834
Epoch 70 - Training Loss: 87911616.0, Testing Loss: 115440872.0
Epoch 70 - RMSE: 10744.341835984698, R-squared: 0.5620442874002902
Epoch 71 - Training Loss: 87572008.0, Testing Loss: 114383840.0
Epoch 71 - RMSE: 10695.038104246201, R-squared: 0.5660544554613174
Epoch 72 - Training Loss: 87250280.0, Testing Loss: 113894328.0
Epoch 72 - RMSE: 10672.128404493815, R-squared: 0.5679115623164872
Epoch 73 - Training Loss: 86918736.0, Testing Loss: 113332328.0
Epoch 73 - RMSE: 10645.765658740986, R-squared: 0.5700436521642152
Epoch 74 - Training Loss: 86627960.0, Testing Loss: 112816872.0
Epoch 74 - RMSE: 10621.500000160000, R-squared: 0.5710001410000000

Epoch 74 - RMSE: 10621.529002169329, R-squared: 0.571999141800438
Epoch 75 - Training Loss: 86386480.0, Testing Loss: 113074952.0
Epoch 75 - RMSE: 10633.670161366548, R-squared: 0.5710201120399385
Epoch 76 - Training Loss: 86028768.0, Testing Loss: 111693672.0
Epoch 76 - RMSE: 10568.522862010068, R-squared: 0.5762603108265762
Epoch 77 - Training Loss: 85700744.0, Testing Loss: 110967488.0
Epoch 77 - RMSE: 10534.1103973407, R-squared: 0.5790153196317291
Epoch 78 - Training Loss: 85432224.0, Testing Loss: 110710752.0
Epoch 78 - RMSE: 10521.917769470194, R-squared: 0.5799892868352978
Epoch 79 - Training Loss: 85100208.0, Testing Loss: 109546552.0
Epoch 79 - RMSE: 10466.448492890071, R-squared: 0.5844060254431733
Epoch 80 - Training Loss: 84800928.0, Testing Loss: 108721992.0
Epoch 80 - RMSE: 10426.98438282838, R-squared: 0.5875341402004555
Epoch 81 - Training Loss: 84501480.0, Testing Loss: 108195136.0
Epoch 81 - RMSE: 10401.688731045593, R-squared: 0.5895329802365354
Epoch 82 - Training Loss: 84258296.0, Testing Loss: 108142560.0
Epoch 82 - RMSE: 10399.16135074793, R-squared: 0.5897324248175113
Epoch 83 - Training Loss: 83948888.0, Testing Loss: 107360136.0
Epoch 83 - RMSE: 10361.473584175166, R-squared: 0.5927007508046782
Epoch 84 - Training Loss: 83633208.0, Testing Loss: 106239112.0
Epoch 84 - RMSE: 10307.235653540298, R-squared: 0.5969536689920136
Epoch 85 - Training Loss: 83352696.0, Testing Loss: 105921968.0
Epoch 85 - RMSE: 10291.83947899226, R-squared: 0.5981568503904967
Epoch 86 - Training Loss: 83087448.0, Testing Loss: 105220440.0
Epoch 86 - RMSE: 10257.701513204824, R-squared: 0.600818251451689
Epoch 87 - Training Loss: 82803336.0, Testing Loss: 104669440.0
Epoch 87 - RMSE: 10230.808599076841, R-squared: 0.6029086004699894
Epoch 88 - Training Loss: 82531536.0, Testing Loss: 103878104.0
Epoch 88 - RMSE: 10192.060821567322, R-squared: 0.6059107624397109
Epoch 89 - Training Loss: 82245496.0, Testing Loss: 103363912.0
Epoch 89 - RMSE: 10166.804688301656, R-squared: 0.6078614647358536
Epoch 90 - Training Loss: 81957304.0, Testing Loss: 102952296.0
Epoch 90 - RMSE: 10146.5412304185, R-squared: 0.6094230495736788
Epoch 91 - Training Loss: 81724592.0, Testing Loss: 103033456.0
Epoch 91 - RMSE: 10150.539596896913, R-squared: 0.6091151658431098
Epoch 92 - Training Loss: 81417344.0, Testing Loss: 101758424.0
Epoch 92 - RMSE: 10087.537688827855, R-squared: 0.6139523599374461
Epoch 93 - Training Loss: 81157456.0, Testing Loss: 101334720.0
Epoch 93 - RMSE: 10066.51478782021, R-squared: 0.6155597659615216
Epoch 94 - Training Loss: 80911920.0, Testing Loss: 101294424.0
Epoch 94 - RMSE: 10064.513216053423, R-squared: 0.6157126308277797
Epoch 95 - Training Loss: 80622240.0, Testing Loss: 100393776.0
Epoch 95 - RMSE: 10019.669421448105, R-squared: 0.6191294899884823
Epoch 96 - Training Loss: 80374984.0, Testing Loss: 100203352.0
Epoch 96 - RMSE: 10010.162576308536, R-squared: 0.6198519008840163
Epoch 97 - Training Loss: 80114056.0, Testing Loss: 99485896.0
Epoch 97 - RMSE: 9974.261561642517, R-squared: 0.6225737805599458
Epoch 98 - Training Loss: 79839632.0, Testing Loss: 98902776.0
Epoch 98 - RMSE: 9944.98736058806, R-squared: 0.6247860018689978
Epoch 99 - Training Loss: 79579896.0, Testing Loss: 98237696.0
Epoch 99 - RMSE: 9911.493347223495, R-squared: 0.6273091342005244
Epoch 100 - Training Loss: 79325152.0, Testing Loss: 97627784.0
Epoch 100 - RMSE: 9880.677645647715, R-squared: 0.6296229887493581
Epoch 101 - Training Loss: 79078080.0, Testing Loss: 97458896.0
Epoch 101 - RMSE: 9872.12707568963, R-squared: 0.6302637472789883
Epoch 102 - Training Loss: 78838976.0, Testing Loss: 97209744.0
Epoch 102 - RMSE: 9859.50003085615, R-squared: 0.6312089722431558
Epoch 103 - Training Loss: 78566448.0, Testing Loss: 96277600.0
Epoch 103 - RMSE: 9812.114820543535, R-squared: 0.6347453071390015
Epoch 104 - Training Loss: 78329992.0, Testing Loss: 96183496.0
Epoch 104 - RMSE: 9807.319366011887, R-squared: 0.6351022402335309
Epoch 105 - Training Loss: 78046960.0, Testing Loss: 95380936.0
Epoch 105 - RMSE: 9766.316448238229, R-squared: 0.6381470266057232
Epoch 106 - Training Loss: 77809520.0, Testing Loss: 94621624.0
Epoch 106 - RMSE: 9727.36463216918, R-squared: 0.6410276874450723
Epoch 107 - Training Loss: 77559584.0, Testing Loss: 94344784.0
Epoch 107 - RMSE: 9713.12394565021, R-squared: 0.6420779760727535
Epoch 108 - Training Loss: 77307056.0, Testing Loss: 93933928.0
Epoch 108 - RMSE: 9691.951986548222, R-squared: 0.6436366201519208
Epoch 109 - Training Loss: 77051912.0, Testing Loss: 93564832.0
Epoch 109 - RMSE: 9672.891332385107, R-squared: 0.6450369242193268
Epoch 110 - Training Loss: 76818416.0, Testing Loss: 92948360.0
Epoch 110 - RMSE: 9649.870514701005, R-squared: 0.6470756000730000

Epoch 110 - RMSE: 0.640.972514791905, R-squared: 0.6473756888733038
Epoch 111 - Training Loss: 76571616.0, Testing Loss: 92570952.0
Epoch 111 - RMSE: 9621.379969309623, R-squared: 0.6488074506060382
Epoch 112 - Training Loss: 76358968.0, Testing Loss: 92419040.0
Epoch 112 - RMSE: 9613.482583704917, R-squared: 0.6493837431388483
Epoch 113 - Training Loss: 76104000.0, Testing Loss: 91640496.0
Epoch 113 - RMSE: 9572.904467664119, R-squared: 0.6523373700910828
Epoch 114 - Training Loss: 75883568.0, Testing Loss: 91366896.0
Epoch 114 - RMSE: 9558.60278446164, R-squared: 0.6533753929123228
Epoch 115 - Training Loss: 75625808.0, Testing Loss: 90641328.0
Epoch 115 - RMSE: 9520.573452088442, R-squared: 0.6561280295249452
Epoch 116 - Training Loss: 75392344.0, Testing Loss: 90122824.0
Epoch 116 - RMSE: 9493.30452672773, R-squared: 0.6580950518405451
Epoch 117 - Training Loss: 75178824.0, Testing Loss: 90322240.0
Epoch 117 - RMSE: 9503.801284813719, R-squared: 0.6573385444218606
Epoch 118 - Training Loss: 74925720.0, Testing Loss: 88993032.0
Epoch 118 - RMSE: 9433.611286906167, R-squared: 0.6623812827351687
Epoch 119 - Training Loss: 74706296.0, Testing Loss: 89238496.0
Epoch 119 - RMSE: 9446.612848667148, R-squared: 0.6614500178440021
Epoch 120 - Training Loss: 74469728.0, Testing Loss: 88702528.0
Epoch 120 - RMSE: 9418.201615758282, R-squared: 0.6634833727125491
Epoch 121 - Training Loss: 74260288.0, Testing Loss: 88435328.0
Epoch 121 - RMSE: 9404.005712011136, R-squared: 0.6644970603736565
Epoch 122 - Training Loss: 74016024.0, Testing Loss: 87954816.0
Epoch 122 - RMSE: 9378.42281186204, R-squared: 0.6663199991448989
Epoch 123 - Training Loss: 73773456.0, Testing Loss: 87326400.0
Epoch 123 - RMSE: 9344.859770720432, R-squared: 0.6687040409053266
Epoch 124 - Training Loss: 73557384.0, Testing Loss: 86700888.0
Epoch 124 - RMSE: 9311.330922462152, R-squared: 0.6710771197558889
Epoch 125 - Training Loss: 73330232.0, Testing Loss: 86316128.0
Epoch 125 - RMSE: 9290.64712456089, R-squared: 0.6725368075432027
Epoch 126 - Training Loss: 73136552.0, Testing Loss: 86440112.0
Epoch 126 - RMSE: 9297.317888164525, R-squared: 0.6720663960129908
Epoch 127 - Training Loss: 72905368.0, Testing Loss: 85653152.0
Epoch 127 - RMSE: 9254.898589614848, R-squared: 0.6750519838115709
Epoch 128 - Training Loss: 72698264.0, Testing Loss: 85511648.0
Epoch 128 - RMSE: 9247.250933907213, R-squared: 0.6755887944025818
Epoch 129 - Training Loss: 72475184.0, Testing Loss: 84919552.0
Epoch 129 - RMSE: 9215.180788303114, R-squared: 0.6778350563248019
Epoch 130 - Training Loss: 72299976.0, Testing Loss: 85241920.0
Epoch 130 - RMSE: 9232.65448044242, R-squared: 0.6766121289884677
Epoch 131 - Training Loss: 72036544.0, Testing Loss: 83770864.0
Epoch 131 - RMSE: 9152.642402884801, R-squared: 0.6821929328021941
Epoch 132 - Training Loss: 71846120.0, Testing Loss: 84023288.0
Epoch 132 - RMSE: 9166.422041731978, R-squared: 0.6812352720547494
Epoch 133 - Training Loss: 71617064.0, Testing Loss: 83553928.0
Epoch 133 - RMSE: 9140.783156531954, R-squared: 0.6830159761128628
Epoch 134 - Training Loss: 71405264.0, Testing Loss: 82593520.0
Epoch 134 - RMSE: 9088.098153943156, R-squared: 0.6866594661323109
Epoch 135 - Training Loss: 71245000.0, Testing Loss: 83216424.0
Epoch 135 - RMSE: 9122.303628937496, R-squared: 0.6842963464643181
Epoch 136 - Training Loss: 71000280.0, Testing Loss: 82424488.0
Epoch 136 - RMSE: 9078.793284045225, R-squared: 0.6873007664976511
Epoch 137 - Training Loss: 70794552.0, Testing Loss: 82172424.0
Epoch 137 - RMSE: 9064.899854195739, R-squared: 0.6882570919750703
Epoch 138 - Training Loss: 70636224.0, Testing Loss: 82172464.0
Epoch 138 - RMSE: 9064.902773224507, R-squared: 0.688256891203594
Epoch 139 - Training Loss: 70396088.0, Testing Loss: 81414424.0
Epoch 139 - RMSE: 9022.99365873538, R-squared: 0.6911327470198585
Epoch 140 - Training Loss: 70206416.0, Testing Loss: 80841920.0
Epoch 140 - RMSE: 8991.213786615168, R-squared: 0.6933046372222977
Epoch 141 - Training Loss: 69998928.0, Testing Loss: 80459016.0
Epoch 141 - RMSE: 8969.894846849182, R-squared: 0.6947573150348891
Epoch 142 - Training Loss: 69804688.0, Testing Loss: 80219136.0
Epoch 142 - RMSE: 8956.513662260044, R-squared: 0.6956673506976127
Epoch 143 - Training Loss: 69614792.0, Testing Loss: 79783752.0
Epoch 143 - RMSE: 8932.175122079, R-squared: 0.697319097959806
Epoch 144 - Training Loss: 69434136.0, Testing Loss: 79892568.0
Epoch 144 - RMSE: 8938.26449636641, R-squared: 0.6969062610992742
Epoch 145 - Training Loss: 69224336.0, Testing Loss: 79371512.0
Epoch 145 - RMSE: 8909.068940201096, R-squared: 0.698883051628049
Epoch 146 - Training Loss: 69048320.0, Testing Loss: 78679392.0
Epoch 146 - RMSE: 8878.148485688553, R-squared: 0.6981588786888514

Epoch 146 - RMSE: 8870.140425632553, R-squared: 0.701508786292514
Epoch 147 - Training Loss: 68857536.0, Testing Loss: 78798936.0
Epoch 147 - RMSE: 8876.87623281305, R-squared: 0.7010552776532084
Epoch 148 - Training Loss: 68674768.0, Testing Loss: 78618296.0
Epoch 148 - RMSE: 8866.695172908992, R-squared: 0.7017406153056924
Epoch 149 - Training Loss: 68497696.0, Testing Loss: 77843256.0
Epoch 149 - RMSE: 8822.88208651829, R-squared: 0.7046809167927044
Epoch 150 - Training Loss: 68301048.0, Testing Loss: 77958272.0
Epoch 150 - RMSE: 8829.398277934111, R-squared: 0.7042445364176428
Epoch 151 - Training Loss: 68101648.0, Testing Loss: 77130984.0
Epoch 151 - RMSE: 8782.424493268603, R-squared: 0.707383096307984
Epoch 152 - Training Loss: 67943864.0, Testing Loss: 77505960.0
Epoch 152 - RMSE: 8803.746914496778, R-squared: 0.7059605107949863
Epoch 153 - Training Loss: 67752976.0, Testing Loss: 76593096.0
Epoch 153 - RMSE: 8751.748437279788, R-squared: 0.7094236844963485
Epoch 154 - Training Loss: 67602192.0, Testing Loss: 76960096.0
Epoch 154 - RMSE: 8772.690064299015, R-squared: 0.7080314092772486
Epoch 155 - Training Loss: 67389680.0, Testing Loss: 75966184.0
Epoch 155 - RMSE: 8715.858093092429, R-squared: 0.7118020663631026
Epoch 156 - Training Loss: 67230320.0, Testing Loss: 75965584.0
Epoch 156 - RMSE: 8715.823805975479, R-squared: 0.7118043338293036
Epoch 157 - Training Loss: 67027276.0, Testing Loss: 75319416.0
Epoch 157 - RMSE: 8678.675815079128, R-squared: 0.7142557544324164
Epoch 158 - Training Loss: 66868772.0, Testing Loss: 75528048.0
Epoch 158 - RMSE: 8690.687759560002, R-squared: 0.7134642236969266
Epoch 159 - Training Loss: 66707712.0, Testing Loss: 75411696.0
Epoch 159 - RMSE: 8683.991102422355, R-squared: 0.713905636993879
Epoch 160 - Training Loss: 66515356.0, Testing Loss: 74998328.0
Epoch 160 - RMSE: 8660.15735566455, R-squared: 0.7154738890441612
Epoch 161 - Training Loss: 66359548.0, Testing Loss: 74971360.0
Epoch 161 - RMSE: 8658.599779735769, R-squared: 0.7155762269463467
Epoch 162 - Training Loss: 66184900.0, Testing Loss: 74270480.0
Epoch 162 - RMSE: 8618.031661821198, R-squared: 0.7182352033893706
Epoch 163 - Training Loss: 65999920.0, Testing Loss: 73770864.0
Epoch 163 - RMSE: 8588.996423521654, R-squared: 0.7201306075236003
Epoch 164 - Training Loss: 65849860.0, Testing Loss: 74051264.0
Epoch 164 - RMSE: 8605.304616404816, R-squared: 0.7190668052191255
Epoch 165 - Training Loss: 65681820.0, Testing Loss: 73897384.0
Epoch 165 - RMSE: 8596.358324322086, R-squared: 0.7196506320742382
Epoch 166 - Training Loss: 65509112.0, Testing Loss: 73508096.0
Epoch 166 - RMSE: 8573.686223883116, R-squared: 0.721127473072048
Epoch 167 - Training Loss: 65342920.0, Testing Loss: 72965032.0
Epoch 167 - RMSE: 8541.956595372843, R-squared: 0.7231877650115093
Epoch 168 - Training Loss: 65177104.0, Testing Loss: 72810056.0
Epoch 168 - RMSE: 8532.881455756004, R-squared: 0.723775633890313
Epoch 169 - Training Loss: 65014636.0, Testing Loss: 72473280.0
Epoch 169 - RMSE: 8513.123525021849, R-squared: 0.7250533507659587
Epoch 170 - Training Loss: 64863948.0, Testing Loss: 72011064.0
Epoch 170 - RMSE: 8485.932789588762, R-squared: 0.7268068933947172
Epoch 171 - Training Loss: 64690432.0, Testing Loss: 72033312.0
Epoch 171 - RMSE: 8487.244038663432, R-squared: 0.7267224590977257
Epoch 172 - Training Loss: 64527812.0, Testing Loss: 71708352.0
Epoch 172 - RMSE: 8468.078479036843, R-squared: 0.7279552746981279
Epoch 173 - Training Loss: 64432596.0, Testing Loss: 72561768.0
Epoch 173 - RMSE: 8518.320052123381, R-squared: 0.7247175859248396
Epoch 174 - Training Loss: 64228408.0, Testing Loss: 71515360.0
Epoch 174 - RMSE: 8456.675046021066, R-squared: 0.7286874726839758
Epoch 175 - Training Loss: 64072396.0, Testing Loss: 71053808.0
Epoch 175 - RMSE: 8429.342580265427, R-squared: 0.730438434245371
Epoch 176 - Training Loss: 63906516.0, Testing Loss: 70493888.0
Epoch 176 - RMSE: 8396.063905588802, R-squared: 0.7325626672320475
Epoch 177 - Training Loss: 63786716.0, Testing Loss: 70994504.0
Epoch 177 - RMSE: 8425.82451924709, R-squared: 0.7306633951197636
Epoch 178 - Training Loss: 63614000.0, Testing Loss: 70442952.0
Epoch 178 - RMSE: 8393.03037367561, R-squared: 0.7327558847047901
Epoch 179 - Training Loss: 63450192.0, Testing Loss: 70102776.0
Epoch 179 - RMSE: 8372.740132353732, R-squared: 0.734046453888348
Epoch 180 - Training Loss: 63313588.0, Testing Loss: 70106368.0
Epoch 180 - RMSE: 8372.954909461681, R-squared: 0.7340328092594193
Epoch 181 - Training Loss: 63155540.0, Testing Loss: 69705800.0
Epoch 181 - RMSE: 8349.000472698754, R-squared: 0.7355524592977849
Epoch 182 - Training Loss: 63004612.0, Testing Loss: 69274360.0
Epoch 182 - RMSE: 8322.100500375005, R-squared: 0.7371005000375005

Epoch 182 - RMSE: 8323.122352375805, R-squared: 0.7371892539227709
Epoch 183 - Training Loss: 62877908.0, Testing Loss: 69517440.0
Epoch 183 - RMSE: 8337.712248738273, R-squared: 0.736267065806957
Epoch 184 - Training Loss: 62710556.0, Testing Loss: 68882424.0
Epoch 184 - RMSE: 8299.54368742239, R-squared: 0.7386761836778624
Epoch 185 - Training Loss: 62564052.0, Testing Loss: 68472952.0
Epoch 185 - RMSE: 8274.83866631331, R-squared: 0.7402296188853714
Epoch 186 - Training Loss: 62421848.0, Testing Loss: 68942256.0
Epoch 186 - RMSE: 8303.147261559416, R-squared: 0.7384492063356376
Epoch 187 - Training Loss: 62280032.0, Testing Loss: 68041976.0
Epoch 187 - RMSE: 8248.756074594823, R-squared: 0.7418646493136399
Epoch 188 - Training Loss: 62130804.0, Testing Loss: 68070592.0
Epoch 188 - RMSE: 8250.490477775696, R-squared: 0.7417560855889653
Epoch 189 - Training Loss: 61996528.0, Testing Loss: 68298960.0
Epoch 189 - RMSE: 8264.319207178292, R-squared: 0.7408896696900642
Epoch 190 - Training Loss: 61861272.0, Testing Loss: 68155688.0
Epoch 190 - RMSE: 8255.645686952348, R-squared: 0.7414332642187804
Epoch 191 - Training Loss: 61726600.0, Testing Loss: 67765632.0
Epoch 191 - RMSE: 8231.988045788517, R-squared: 0.7429130550517156
Epoch 192 - Training Loss: 61549356.0, Testing Loss: 67004576.0
Epoch 192 - RMSE: 8185.632399987335, R-squared: 0.7458002985236043
Epoch 193 - Training Loss: 61414884.0, Testing Loss: 66894448.0
Epoch 193 - RMSE: 8178.902539594935, R-squared: 0.7462181099228651
Epoch 194 - Training Loss: 61269928.0, Testing Loss: 66691932.0
Epoch 194 - RMSE: 8166.5131910824675, R-squared: 0.7469863819168328
Epoch 195 - Training Loss: 61118760.0, Testing Loss: 66544820.0
Epoch 195 - RMSE: 8157.500637070296, R-squared: 0.7475445248054611
Epoch 196 - Training Loss: 61017000.0, Testing Loss: 67061428.0
Epoch 196 - RMSE: 8189.104051512267, R-squared: 0.7455846328609996
Epoch 197 - Training Loss: 60852844.0, Testing Loss: 66089968.0
Epoch 197 - RMSE: 8129.573449072627, R-squared: 0.7492701276250403
Epoch 198 - Training Loss: 60719764.0, Testing Loss: 66254508.0
Epoch 198 - RMSE: 8139.68737160589, R-squared: 0.7486458784088428
Epoch 199 - Training Loss: 60587268.0, Testing Loss: 65961260.0
Epoch 199 - RMSE: 8121.654078413813, R-squared: 0.7497583834151615
Epoch 200 - Training Loss: 60452848.0, Testing Loss: 65537656.0
Epoch 200 - RMSE: 8095.532928537977, R-squared: 0.7513654666741596
Epoch 201 - Training Loss: 60318956.0, Testing Loss: 65640260.0
Epoch 201 - RMSE: 8101.867672299786, R-squared: 0.7509762020501559
Epoch 202 - Training Loss: 60174136.0, Testing Loss: 64943984.0
Epoch 202 - RMSE: 8058.783305698378, R-squared: 0.7536176929860054
Epoch 203 - Training Loss: 60045040.0, Testing Loss: 65098076.0
Epoch 203 - RMSE: 8068.338023751042, R-squared: 0.753033111185354
Epoch 204 - Training Loss: 59931980.0, Testing Loss: 65283584.0
Epoch 204 - RMSE: 8079.825561541866, R-squared: 0.7523293575445565
Epoch 205 - Training Loss: 59785628.0, Testing Loss: 64621728.0
Epoch 205 - RMSE: 8038.764074487208, R-squared: 0.7548402740608006
Epoch 206 - Training Loss: 59652488.0, Testing Loss: 64446388.0
Epoch 206 - RMSE: 8027.850930189778, R-squared: 0.7555054627347347
Epoch 207 - Training Loss: 59530164.0, Testing Loss: 64292576.0
Epoch 207 - RMSE: 8018.265463783194, R-squared: 0.7560889800514345
Epoch 208 - Training Loss: 59379436.0, Testing Loss: 64058836.0
Epoch 208 - RMSE: 8003.676197994797, R-squared: 0.7569757666957831
Epoch 209 - Training Loss: 59266968.0, Testing Loss: 64446268.0
Epoch 209 - RMSE: 8027.843122664348, R-squared: 0.7555059383032039
Epoch 210 - Training Loss: 59132276.0, Testing Loss: 63858740.0
Epoch 210 - RMSE: 7991.165923018982, R-squared: 0.7577348988281543
Epoch 211 - Training Loss: 59018400.0, Testing Loss: 63933644.0
Epoch 211 - RMSE: 7995.851653844768, R-squared: 0.7574507045365015
Epoch 212 - Training Loss: 58882512.0, Testing Loss: 63765452.0
Epoch 212 - RMSE: 7985.327004993355, R-squared: 0.7580888019477254
Epoch 213 - Training Loss: 58768000.0, Testing Loss: 63730732.0
Epoch 213 - RMSE: 7983.152888290604, R-squared: 0.7582205114139139
Epoch 214 - Training Loss: 58632656.0, Testing Loss: 63468256.0
Epoch 214 - RMSE: 7966.6968975640475, R-squared: 0.7592162634256007
Epoch 215 - Training Loss: 58509796.0, Testing Loss: 63193352.0
Epoch 215 - RMSE: 7949.42439848485, R-squared: 0.7602592122038339
Epoch 216 - Training Loss: 58365176.0, Testing Loss: 62349888.0
Epoch 216 - RMSE: 7896.194009005179, R-squared: 0.7634591342475642
Epoch 217 - Training Loss: 58238492.0, Testing Loss: 62295336.0
Epoch 217 - RMSE: 7892.739416260933, R-squared: 0.7636660627007226
Epoch 218 - Training Loss: 58126380.0, Testing Loss: 62652512.0

Epoch 218 - RMSE: 7915.33413001195, R-squared: 0.7623110094801708
Epoch 219 - Training Loss: 57991940.0, Testing Loss: 62126268.0
Epoch 219 - RMSE: 7882.02151841374, R-squared: 0.7643074833852869
Epoch 220 - Training Loss: 57882344.0, Testing Loss: 62607128.0
Epoch 220 - RMSE: 7912.4666450450595, R-squared: 0.762483193279349
Epoch 221 - Training Loss: 57741352.0, Testing Loss: 61406476.0
Epoch 221 - RMSE: 7836.228385398141, R-squared: 0.767038190413635
Epoch 222 - Training Loss: 57612176.0, Testing Loss: 61540892.0
Epoch 222 - RMSE: 7844.800333063252, R-squared: 0.7665282439054948
Epoch 223 - Training Loss: 57508160.0, Testing Loss: 62112676.0
Epoch 223 - RMSE: 7881.159822661249, R-squared: 0.7643590143633167
Epoch 224 - Training Loss: 57380120.0, Testing Loss: 61541708.0
Epoch 224 - RMSE: 7844.852109066101, R-squared: 0.7665251620490583
Epoch 225 - Training Loss: 57264464.0, Testing Loss: 60999116.0
Epoch 225 - RMSE: 7810.1929870023005, R-squared: 0.7685836220946499
Epoch 226 - Training Loss: 57147516.0, Testing Loss: 60940068.0
Epoch 226 - RMSE: 7806.412076203479, R-squared: 0.7688076249838753
Epoch 227 - Training Loss: 57029148.0, Testing Loss: 61058756.0
Epoch 227 - RMSE: 7814.0096840197675, R-squared: 0.7683573890133767
Epoch 228 - Training Loss: 56912204.0, Testing Loss: 60752820.0
Epoch 228 - RMSE: 7794.409736592347, R-squared: 0.7695179938988836
Epoch 229 - Training Loss: 56801968.0, Testing Loss: 60743380.0
Epoch 229 - RMSE: 7793.803673648405, R-squared: 0.769553835271642
Epoch 230 - Training Loss: 56713108.0, Testing Loss: 60986740.0
Epoch 230 - RMSE: 7809.400974946343, R-squared: 0.7686305544222731
Epoch 231 - Training Loss: 56579184.0, Testing Loss: 60245052.0
Epoch 231 - RMSE: 7761.769159553977, R-squared: 0.7714443266922021
Epoch 232 - Training Loss: 56464632.0, Testing Loss: 60192456.0
Epoch 232 - RMSE: 7758.379555162522, R-squared: 0.7716439059730017
Epoch 233 - Training Loss: 56355348.0, Testing Loss: 60453340.0
Epoch 233 - RMSE: 7775.174428042366, R-squared: 0.7706541728307248
Epoch 234 - Training Loss: 56254976.0, Testing Loss: 60232760.0
Epoch 234 - RMSE: 7760.976639991022, R-squared: 0.7714909979062419
Epoch 235 - Training Loss: 56173096.0, Testing Loss: 60489516.0
Epoch 235 - RMSE: 7777.500584215261, R-squared: 0.7705169221436228
Epoch 236 - Training Loss: 56047960.0, Testing Loss: 59742508.0
Epoch 236 - RMSE: 7729.327641486548, R-squared: 0.7733509017070483
Epoch 237 - Training Loss: 55961140.0, Testing Loss: 60075568.0
Epoch 237 - RMSE: 7750.842953345196, R-squared: 0.7720873472934049
Epoch 238 - Training Loss: 55849244.0, Testing Loss: 59661688.0
Epoch 238 - RMSE: 7724.097888267613, R-squared: 0.7736575047923484
Epoch 239 - Training Loss: 55745100.0, Testing Loss: 59352292.0
Epoch 239 - RMSE: 7704.0439510759015, R-squared: 0.7748312770335855
Epoch 240 - Training Loss: 55657968.0, Testing Loss: 59672328.0
Epoch 240 - RMSE: 7724.786613796459, R-squared: 0.7736171389640273
Epoch 241 - Training Loss: 55564784.0, Testing Loss: 59624288.0
Epoch 241 - RMSE: 7721.6760415043445, R-squared: 0.7737994193330615
Epoch 242 - Training Loss: 55444900.0, Testing Loss: 58709988.0
Epoch 242 - RMSE: 7662.244834180816, R-squared: 0.7772680028157477
Epoch 243 - Training Loss: 55343168.0, Testing Loss: 58824476.0
Epoch 243 - RMSE: 7669.711412593099, R-squared: 0.7768337028823112
Epoch 244 - Training Loss: 55249000.0, Testing Loss: 58477276.0
Epoch 244 - RMSE: 7647.043594190777, R-squared: 0.7781508887177719
Epoch 245 - Training Loss: 55153648.0, Testing Loss: 58571220.0
Epoch 245 - RMSE: 7653.183621810997, R-squared: 0.7777944878388505
Epoch 246 - Training Loss: 55082140.0, Testing Loss: 58974216.0
Epoch 246 - RMSE: 7679.467258794198, R-squared: 0.7762656082996229
Epoch 247 - Training Loss: 54970432.0, Testing Loss: 58432128.0
Epoch 247 - RMSE: 7644.091468194764, R-squared: 0.7783221444727576
Epoch 248 - Training Loss: 54875876.0, Testing Loss: 58439392.0
Epoch 248 - RMSE: 7644.566220801417, R-squared: 0.7782946080654997
Epoch 249 - Training Loss: 54794376.0, Testing Loss: 58422572.0
Epoch 249 - RMSE: 7643.466029469561, R-squared: 0.778358418304369
Epoch 250 - Training Loss: 54703036.0, Testing Loss: 57442788.0
Epoch 250 - RMSE: 7579.101904186225, R-squared: 0.7820755021166886
Epoch 251 - Training Loss: 54599492.0, Testing Loss: 57904076.0
Epoch 251 - RMSE: 7609.472879366753, R-squared: 0.7803254687788761
Epoch 252 - Training Loss: 54503808.0, Testing Loss: 57545532.0
Epoch 252 - RMSE: 7585.8771974644005, R-squared: 0.781685703335879
Epoch 253 - Training Loss: 54426572.0, Testing Loss: 57895468.0
Epoch 253 - RMSE: 7608.906987157034, R-squared: 0.7803581405514194
Epoch 254 - Training Loss: 54339336.0, Testing Loss: 57615652.0
Epoch 254 - RMSE: 7588.487588513888, R-squared: 0.781418681418618

Epoch 254 - RMSE: 7590.497589513922, R-squared: 0.781419681410613
Epoch 255 - Training Loss: 54253972.0, Testing Loss: 57751112.0
Epoch 255 - RMSE: 7599.415158067637, R-squared: 0.7809057888896365
Epoch 256 - Training Loss: 54184064.0, Testing Loss: 57804316.0
Epoch 256 - RMSE: 7602.914708857281, R-squared: 0.7807039554999751
Epoch 257 - Training Loss: 54091160.0, Testing Loss: 57261436.0
Epoch 257 - RMSE: 7567.128630367503, R-squared: 0.7827635014835639
Epoch 258 - Training Loss: 53994468.0, Testing Loss: 56952260.0
Epoch 258 - RMSE: 7546.672110417137, R-squared: 0.7839364420513893
Epoch 259 - Training Loss: 53917444.0, Testing Loss: 57173836.0
Epoch 259 - RMSE: 7561.338514851085, R-squared: 0.78309581860396
Epoch 260 - Training Loss: 53835712.0, Testing Loss: 57208684.0
Epoch 260 - RMSE: 7563.642234576884, R-squared: 0.7829636296905118
Epoch 261 - Training Loss: 53753144.0, Testing Loss: 56866528.0
Epoch 261 - RMSE: 7540.989858876723, R-squared: 0.7842616887984477
Epoch 262 - Training Loss: 53667020.0, Testing Loss: 56462132.0
Epoch 262 - RMSE: 7514.129083229464, R-squared: 0.7857958581471434
Epoch 263 - Training Loss: 53578116.0, Testing Loss: 56630288.0
Epoch 263 - RMSE: 7525.310029241319, R-squared: 0.7851579167995133
Epoch 264 - Training Loss: 53511752.0, Testing Loss: 56718556.0
Epoch 264 - RMSE: 7531.172230585506, R-squared: 0.7848230633256813
Epoch 265 - Training Loss: 53429820.0, Testing Loss: 56512060.0
Epoch 265 - RMSE: 7517.450111118194, R-squared: 0.7856064722248799
Epoch 266 - Training Loss: 53350360.0, Testing Loss: 56108832.0
Epoch 266 - RMSE: 7490.582929830047, R-squared: 0.7871362080731076
Epoch 267 - Training Loss: 53267648.0, Testing Loss: 56227712.0
Epoch 267 - RMSE: 7498.513914435858, R-squared: 0.7866852116123288
Epoch 268 - Training Loss: 53188536.0, Testing Loss: 55938668.0
Epoch 268 - RMSE: 7479.216078742714, R-squared: 0.7877817533397983
Epoch 269 - Training Loss: 53109256.0, Testing Loss: 56109168.0
Epoch 269 - RMSE: 7490.605473237243, R-squared: 0.7871349268157195
Epoch 270 - Training Loss: 53044852.0, Testing Loss: 55984748.0
Epoch 270 - RMSE: 7482.295682273724, R-squared: 0.7876069535731727
Epoch 271 - Training Loss: 52963744.0, Testing Loss: 55592248.0
Epoch 271 - RMSE: 7456.02095524917, R-squared: 0.7890960075287899
Epoch 272 - Training Loss: 52890668.0, Testing Loss: 55816088.0
Epoch 272 - RMSE: 7471.0165604821395, R-squared: 0.7882468110504625
Epoch 273 - Training Loss: 52818404.0, Testing Loss: 55709536.0
Epoch 273 - RMSE: 7463.881822938418, R-squared: 0.7886510618012832
Epoch 274 - Training Loss: 52756600.0, Testing Loss: 55910636.0
Epoch 274 - RMSE: 7477.341536297298, R-squared: 0.7878881180321239
Epoch 275 - Training Loss: 52669872.0, Testing Loss: 55421764.0
Epoch 275 - RMSE: 7444.57928370831, R-squared: 0.7897427982796552
Epoch 276 - Training Loss: 52597260.0, Testing Loss: 55066988.0
Epoch 276 - RMSE: 7420.713487869956, R-squared: 0.7910887204574878
Epoch 277 - Training Loss: 52525520.0, Testing Loss: 54934624.0
Epoch 277 - RMSE: 7411.789453995956, R-squared: 0.7915908851969038
Epoch 278 - Training Loss: 52447240.0, Testing Loss: 55035244.0
Epoch 278 - RMSE: 7418.574198559169, R-squared: 0.7912091555739449
Epoch 279 - Training Loss: 52380576.0, Testing Loss: 55120744.0
Epoch 279 - RMSE: 7424.334806012465, R-squared: 0.790884772736592
Epoch 280 - Training Loss: 52312008.0, Testing Loss: 55029308.0
Epoch 280 - RMSE: 7418.174253597303, R-squared: 0.7912316673378363
Epoch 281 - Training Loss: 52237520.0, Testing Loss: 54784016.0
Epoch 281 - RMSE: 7401.622314953802, R-squared: 0.7921622643871203
Epoch 282 - Training Loss: 52176548.0, Testing Loss: 54808500.0
Epoch 282 - RMSE: 7403.27620380077, R-squared: 0.79206937153131
Epoch 283 - Training Loss: 52108588.0, Testing Loss: 54804432.0
Epoch 283 - RMSE: 7403.00132201309, R-squared: 0.7920848120687675
Epoch 284 - Training Loss: 52036972.0, Testing Loss: 54490352.0
Epoch 284 - RMSE: 7381.7579048209245, R-squared: 0.7932763536313925
Epoch 285 - Training Loss: 51975204.0, Testing Loss: 54664404.0
Epoch 285 - RMSE: 7393.5377819937885, R-squared: 0.7926160441942562
Epoch 286 - Training Loss: 51899128.0, Testing Loss: 54206728.0
Epoch 286 - RMSE: 7362.5218080313225, R-squared: 0.7943523506702441
Epoch 287 - Training Loss: 51831320.0, Testing Loss: 54382960.0
Epoch 287 - RMSE: 7374.480625386251, R-squared: 0.7936837482420356
Epoch 288 - Training Loss: 51767132.0, Testing Loss: 54361444.0
Epoch 288 - RMSE: 7373.021576740253, R-squared: 0.7937653799348873
Epoch 289 - Training Loss: 51706492.0, Testing Loss: 54445172.0
Epoch 289 - RMSE: 7378.697267630198, R-squared: 0.793447742322702
Epoch 290 - Training Loss: 51648736.0, Testing Loss: 54515756.0
Epoch 290 - RMSE: 7382.47222218666, R-squared: 0.7931782786684285

Epoch 290 - RMSE: 0.738347838218266, R-squared: 0.7931799796224385
Epoch 291 - Training Loss: 51573320.0, Testing Loss: 53933920.0
Epoch 291 - RMSE: 7343.971184150903, R-squared: 0.795387345550845
Epoch 292 - Training Loss: 51521628.0, Testing Loss: 54281324.0
Epoch 292 - RMSE: 7367.586047385834, R-squared: 0.7940693478836064
Epoch 293 - Training Loss: 51453180.0, Testing Loss: 54059380.0
Epoch 293 - RMSE: 7352.508483788085, R-squared: 0.7949113483446211
Epoch 294 - Training Loss: 51387148.0, Testing Loss: 53295300.0
Epoch 294 - RMSE: 7300.363136714587, R-squared: 0.797810085707136
Epoch 295 - Training Loss: 51323172.0, Testing Loss: 53907080.0
Epoch 295 - RMSE: 7342.143968803884, R-squared: 0.7954891501093138
Epoch 296 - Training Loss: 51255396.0, Testing Loss: 53600840.0
Epoch 296 - RMSE: 7321.259435134965, R-squared: 0.7966509467761987
Epoch 297 - Training Loss: 51194908.0, Testing Loss: 53419292.0
Epoch 297 - RMSE: 7308.850075400935, R-squared: 0.7973397061344174
Epoch 298 - Training Loss: 51148164.0, Testing Loss: 53704612.0
Epoch 298 - RMSE: 7328.343384887669, R-squared: 0.796257240912052
Epoch 299 - Training Loss: 51067396.0, Testing Loss: 53304708.0
Epoch 299 - RMSE: 7301.007450118624, R-squared: 0.7977743944905954
Epoch 300 - Training Loss: 51009724.0, Testing Loss: 53347716.0
Epoch 300 - RMSE: 7303.95165203309, R-squared: 0.7976112627398169
Epoch 301 - Training Loss: 50955648.0, Testing Loss: 53426404.0
Epoch 301 - RMSE: 7309.33698556805, R-squared: 0.7973127030782754
Epoch 302 - Training Loss: 50899400.0, Testing Loss: 53184920.0
Epoch 302 - RMSE: 7292.798992908881, R-squared: 0.7982288597412261
Epoch 303 - Training Loss: 50842168.0, Testing Loss: 53316872.0
Epoch 303 - RMSE: 7301.840122105895, R-squared: 0.79772826463792
Epoch 304 - Training Loss: 50770904.0, Testing Loss: 52908196.0
Epoch 304 - RMSE: 7273.8018712374715, R-squared: 0.7992786839563198
Epoch 305 - Training Loss: 50719832.0, Testing Loss: 53036712.0
Epoch 305 - RMSE: 7282.630691380249, R-squared: 0.7987911238269607
Epoch 306 - Training Loss: 50680400.0, Testing Loss: 53369436.0
Epoch 306 - RMSE: 7305.438356609366, R-squared: 0.7975288627187835
Epoch 307 - Training Loss: 50603788.0, Testing Loss: 52409884.0
Epoch 307 - RMSE: 7239.466683921076, R-squared: 0.8011691775668027
Epoch 308 - Training Loss: 50547752.0, Testing Loss: 52866944.0
Epoch 308 - RMSE: 7270.965782600839, R-squared: 0.799435177760915
Epoch 309 - Training Loss: 50476580.0, Testing Loss: 52357748.0
Epoch 309 - RMSE: 7235.86541854391, R-squared: 0.8013669447479155
Epoch 310 - Training Loss: 50444612.0, Testing Loss: 52989096.0
Epoch 310 - RMSE: 7279.361212474493, R-squared: 0.7989717455106152
Epoch 311 - Training Loss: 50366588.0, Testing Loss: 52196412.0
Epoch 311 - RMSE: 7224.708548506208, R-squared: 0.8019790110458241
Epoch 312 - Training Loss: 50311148.0, Testing Loss: 52334056.0
Epoch 312 - RMSE: 7234.22795915366, R-squared: 0.801456834965786
Epoch 313 - Training Loss: 50264804.0, Testing Loss: 52542788.0
Epoch 313 - RMSE: 7248.640605387847, R-squared: 0.8006649376380994
Epoch 314 - Training Loss: 50198344.0, Testing Loss: 51993396.0
Epoch 314 - RMSE: 7210.645044295827, R-squared: 0.8027491898017083
Epoch 315 - Training Loss: 50150472.0, Testing Loss: 52271336.0
Epoch 315 - RMSE: 7229.891781534565, R-squared: 0.8016947761579518
Epoch 316 - Training Loss: 50092632.0, Testing Loss: 52041372.0
Epoch 316 - RMSE: 7213.970897590418, R-squared: 0.8025671870691835
Epoch 317 - Training Loss: 50041160.0, Testing Loss: 51837524.0
Epoch 317 - RMSE: 7199.82768687601, R-squared: 0.8033405743441842
Epoch 318 - Training Loss: 49986176.0, Testing Loss: 51788652.0
Epoch 318 - RMSE: 7196.433404813892, R-squared: 0.8035259566179974
Epoch 319 - Training Loss: 49932772.0, Testing Loss: 51787880.0
Epoch 319 - RMSE: 7196.379867772011, R-squared: 0.8035288798993985
Epoch 320 - Training Loss: 49883704.0, Testing Loss: 51906160.0
Epoch 320 - RMSE: 7204.593045627549, R-squared: 0.8030801617640229
Epoch 321 - Training Loss: 49826820.0, Testing Loss: 51622948.0
Epoch 321 - RMSE: 7184.911067543201, R-squared: 0.8041546090985195
Epoch 322 - Training Loss: 49773900.0, Testing Loss: 51597540.0
Epoch 322 - RMSE: 7183.142763906968, R-squared: 0.8042509976264568
Epoch 323 - Training Loss: 49727484.0, Testing Loss: 51723176.0
Epoch 323 - RMSE: 7191.882312767504, R-squared: 0.8037743820989719
Epoch 324 - Training Loss: 49674192.0, Testing Loss: 51380780.0
Epoch 324 - RMSE: 7168.038713949588, R-squared: 0.8050733380343577
Epoch 325 - Training Loss: 49628444.0, Testing Loss: 51706704.0
Epoch 325 - RMSE: 7190.737400063541, R-squared: 0.8038368534550154
Epoch 326 - Training Loss: 49566792.0, Testing Loss: 51276044.0
Epoch 326 - RMSE: 7168.78852386476, R-squared: 0.804786888768885

Epoch 326 - RMSE: 7160.729253386476, R-squared: 0.8054706802768895
Epoch 327 - Training Loss: 49517032.0, Testing Loss: 51226784.0
Epoch 327 - RMSE: 7157.288893449428, R-squared: 0.8056575579214057
Epoch 328 - Training Loss: 49463376.0, Testing Loss: 51118840.0
Epoch 328 - RMSE: 7149.743803746441, R-squared: 0.8060670868058679
Epoch 329 - Training Loss: 49414140.0, Testing Loss: 51100428.0
Epoch 329 - RMSE: 7148.456153196074, R-squared: 0.806136934157743
Epoch 330 - Training Loss: 49363044.0, Testing Loss: 51073452.0
Epoch 330 - RMSE: 7146.569577991933, R-squared: 0.8062392468763642
Epoch 331 - Training Loss: 49325448.0, Testing Loss: 51320088.0
Epoch 331 - RMSE: 7163.804103598, R-squared: 0.8053035808314011
Epoch 332 - Training Loss: 49267764.0, Testing Loss: 50952536.0
Epoch 332 - RMSE: 7138.104448726909, R-squared: 0.8066979951995993
Epoch 333 - Training Loss: 49219696.0, Testing Loss: 50710180.0
Epoch 333 - RMSE: 7121.108181152306, R-squared: 0.8076174273078596
Epoch 334 - Training Loss: 49166848.0, Testing Loss: 50550672.0
Epoch 334 - RMSE: 7109.899130118342, R-squared: 0.8082225940455642
Epoch 335 - Training Loss: 49119860.0, Testing Loss: 50802592.0
Epoch 335 - RMSE: 7127.59367603395, R-squared: 0.8072668458186741
Epoch 336 - Training Loss: 49068596.0, Testing Loss: 50655404.0
Epoch 336 - RMSE: 7117.261065414801, R-squared: 0.8078252371270882
Epoch 337 - Training Loss: 49028608.0, Testing Loss: 50682464.0
Epoch 337 - RMSE: 7119.161932780671, R-squared: 0.8077225719266273
Epoch 338 - Training Loss: 48993980.0, Testing Loss: 50761660.0
Epoch 338 - RMSE: 7124.72158737198, R-squared: 0.807422139513932
Epoch 339 - Training Loss: 48936736.0, Testing Loss: 50561692.0
Epoch 339 - RMSE: 7110.674445191713, R-squared: 0.8081807661608496
Epoch 340 - Training Loss: 48894960.0, Testing Loss: 49949656.0
Epoch 340 - RMSE: 7067.507052978286, R-squared: 0.8105026843094487
Epoch 341 - Training Loss: 48846980.0, Testing Loss: 50404812.0
Epoch 341 - RMSE: 7099.634734333776, R-squared: 0.8087759234915857
Epoch 342 - Training Loss: 48791188.0, Testing Loss: 50098532.0
Epoch 342 - RMSE: 7078.03155921059, R-squared: 0.8099378880921372
Epoch 343 - Training Loss: 48744140.0, Testing Loss: 49984988.0
Epoch 343 - RMSE: 7070.005888070738, R-squared: 0.8103686607422355
Epoch 344 - Training Loss: 48698380.0, Testing Loss: 50101404.0
Epoch 344 - RMSE: 7078.234341143039, R-squared: 0.8099269975743124
Epoch 345 - Training Loss: 48653752.0, Testing Loss: 50235612.0
Epoch 345 - RMSE: 7087.708247435443, R-squared: 0.8094178483067196
Epoch 346 - Training Loss: 48606848.0, Testing Loss: 50037612.0
Epoch 346 - RMSE: 7073.726883727507, R-squared: 0.8101689995010064
Epoch 347 - Training Loss: 48564412.0, Testing Loss: 50046096.0
Epoch 347 - RMSE: 7074.326366154701, R-squared: 0.8101368226378145
Epoch 348 - Training Loss: 48516336.0, Testing Loss: 49813716.0
Epoch 348 - RMSE: 7057.883182486633, R-squared: 0.8110184123987396
Epoch 349 - Training Loss: 48471792.0, Testing Loss: 49869896.0
Epoch 349 - RMSE: 7061.861898785649, R-squared: 0.8108052844572524
Epoch 350 - Training Loss: 48428096.0, Testing Loss: 49829908.0
Epoch 350 - RMSE: 7059.030114284759, R-squared: 0.8109569870116293
Epoch 351 - Training Loss: 48386192.0, Testing Loss: 49896556.0
Epoch 351 - RMSE: 7063.748979738114, R-squared: 0.8107041571762058
Epoch 352 - Training Loss: 48339544.0, Testing Loss: 49496880.0
Epoch 352 - RMSE: 7035.40217289427, R-squared: 0.8122203962076455
Epoch 353 - Training Loss: 48294360.0, Testing Loss: 49587884.0
Epoch 353 - RMSE: 7041.866745926581, R-squared: 0.811875150081321
Epoch 354 - Training Loss: 48249600.0, Testing Loss: 49563636.0
Epoch 354 - RMSE: 7040.144777525689, R-squared: 0.8119671442786132
Epoch 355 - Training Loss: 48204236.0, Testing Loss: 49448048.0
Epoch 355 - RMSE: 7031.930406471349, R-squared: 0.8124056780305883
Epoch 356 - Training Loss: 48162484.0, Testing Loss: 49471124.0
Epoch 356 - RMSE: 7033.571264248984, R-squared: 0.8123181198501488
Epoch 357 - Training Loss: 48123012.0, Testing Loss: 49484784.0
Epoch 357 - RMSE: 7034.541863862032, R-squared: 0.8122663178502006
Epoch 358 - Training Loss: 48082132.0, Testing Loss: 49501680.0
Epoch 358 - RMSE: 7035.743141039777, R-squared: 0.8122021944294914
Epoch 359 - Training Loss: 48031392.0, Testing Loss: 49217744.0
Epoch 359 - RMSE: 7015.535823408779, R-squared: 0.813279391305729
Epoch 360 - Training Loss: 47993764.0, Testing Loss: 49328584.0
Epoch 360 - RMSE: 7023.430863777094, R-squared: 0.8128588970574226
Epoch 361 - Training Loss: 47952772.0, Testing Loss: 49015912.0
Epoch 361 - RMSE: 7001.136817773041, R-squared: 0.8140450725226793
Epoch 362 - Training Loss: 47906048.0, Testing Loss: 49066448.0
Epoch 362 - RMSE: 7004.744415004065, R-squared: 0.8138523886600110

Epoch 362 - RMSE: 7.004.744415824065, R-squared: 0.8138533826609118
Epoch 363 - Training Loss: 47865380.0, Testing Loss: 48993864.0
Epoch 363 - RMSE: 6999.561593076296, R-squared: 0.8141287411750505
Epoch 364 - Training Loss: 47818272.0, Testing Loss: 48884952.0
Epoch 364 - RMSE: 6991.777006900899, R-squared: 0.8145419459759814
Epoch 365 - Training Loss: 47777400.0, Testing Loss: 48862992.0
Epoch 365 - RMSE: 6990.206736501639, R-squared: 0.8146252399912359
Epoch 366 - Training Loss: 47739092.0, Testing Loss: 48816080.0
Epoch 366 - RMSE: 6986.850756993664, R-squared: 0.8148031931138613
Epoch 367 - Training Loss: 47698880.0, Testing Loss: 48631516.0
Epoch 367 - RMSE: 6973.630114249813, R-squared: 0.8155033953748225
Epoch 368 - Training Loss: 47660764.0, Testing Loss: 48957792.0
Epoch 368 - RMSE: 6996.984917540814, R-squared: 0.8142655616793805
Epoch 369 - Training Loss: 47616660.0, Testing Loss: 48766564.0
Epoch 369 - RMSE: 6983.306118747769, R-squared: 0.8149910571996235
Epoch 370 - Training Loss: 47578324.0, Testing Loss: 48588216.0
Epoch 370 - RMSE: 6970.524665444816, R-squared: 0.8156676762962575
Epoch 371 - Training Loss: 47550524.0, Testing Loss: 48933460.0
Epoch 371 - RMSE: 6995.245572924922, R-squared: 0.8143578917460145
Epoch 372 - Training Loss: 47494972.0, Testing Loss: 48339644.0
Epoch 372 - RMSE: 6952.671940001658, R-squared: 0.8166106813995107
Epoch 373 - Training Loss: 47458252.0, Testing Loss: 48614292.0
Epoch 373 - RMSE: 6972.395049090487, R-squared: 0.8155687401512455
Epoch 374 - Training Loss: 47443120.0, Testing Loss: 48927276.0
Epoch 374 - RMSE: 6994.803443733668, R-squared: 0.8143813577417389
Epoch 375 - Training Loss: 47388152.0, Testing Loss: 48670628.0
Epoch 375 - RMSE: 6976.434025247684, R-squared: 0.8153550032034558
Epoch 376 - Training Loss: 47344068.0, Testing Loss: 48275472.0
Epoch 376 - RMSE: 6948.055518272672, R-squared: 0.8168541335226158
Epoch 377 - Training Loss: 47302724.0, Testing Loss: 48305716.0
Epoch 377 - RMSE: 6950.231226558391, R-squared: 0.8167394152775664
Epoch 378 - Training Loss: 47265004.0, Testing Loss: 48324188.0
Epoch 378 - RMSE: 6951.56038254237, R-squared: 0.8166693153956884
Epoch 379 - Training Loss: 47225944.0, Testing Loss: 47981260.0
Epoch 379 - RMSE: 6926.850438004901, R-squared: 0.8179703296981993
Epoch 380 - Training Loss: 47181504.0, Testing Loss: 48003680.0
Epoch 380 - RMSE: 6928.4689626654435, R-squared: 0.8178852538232976
Epoch 381 - Training Loss: 47144108.0, Testing Loss: 47833112.0
Epoch 381 - RMSE: 6916.148343772923, R-squared: 0.818532372658492
Epoch 382 - Training Loss: 47113360.0, Testing Loss: 48361516.0
Epoch 382 - RMSE: 6954.244433084755, R-squared: 0.816527717310617
Epoch 383 - Training Loss: 47068184.0, Testing Loss: 48048616.0
Epoch 383 - RMSE: 6931.711139590209, R-squared: 0.8177147727600166
Epoch 384 - Training Loss: 47028692.0, Testing Loss: 47995588.0
Epoch 384 - RMSE: 6927.885009110412, R-squared: 0.8179159509578051
Epoch 385 - Training Loss: 46990820.0, Testing Loss: 47981200.0
Epoch 385 - RMSE: 6926.8465757239455, R-squared: 0.8179705326907538
Epoch 386 - Training Loss: 46956000.0, Testing Loss: 47920560.0
Epoch 386 - RMSE: 6922.467731275743, R-squared: 0.8182006018209877
Epoch 387 - Training Loss: 46926696.0, Testing Loss: 48088416.0
Epoch 387 - RMSE: 6934.5808926088275, R-squared: 0.8175638080541814
Epoch 388 - Training Loss: 46886796.0, Testing Loss: 47918856.0
Epoch 388 - RMSE: 6922.3444437238295, R-squared: 0.8182070773739323
Epoch 389 - Training Loss: 46846240.0, Testing Loss: 47532976.0
Epoch 389 - RMSE: 6894.416177348937, R-squared: 0.8196710089309831
Epoch 390 - Training Loss: 46813152.0, Testing Loss: 47782024.0
Epoch 390 - RMSE: 6912.454318272657, R-squared: 0.8187261704165177
Epoch 391 - Training Loss: 46771004.0, Testing Loss: 47606504.0
Epoch 391 - RMSE: 6899.746907662812, R-squared: 0.8193920420612611
Epoch 392 - Training Loss: 46736572.0, Testing Loss: 47678964.0
Epoch 392 - RMSE: 6904.9956620452385, R-squared: 0.8191171544775191
Epoch 393 - Training Loss: 46705484.0, Testing Loss: 47458388.0
Epoch 393 - RMSE: 6889.004703621616, R-squared: 0.8199539807152383
Epoch 394 - Training Loss: 46663132.0, Testing Loss: 47567044.0
Epoch 394 - RMSE: 6896.886360363549, R-squared: 0.819541766541747
Epoch 395 - Training Loss: 46626604.0, Testing Loss: 47385308.0
Epoch 395 - RMSE: 6883.698367998786, R-squared: 0.8202312389546909
Epoch 396 - Training Loss: 46590036.0, Testing Loss: 47351776.0
Epoch 396 - RMSE: 6881.263008934904, R-squared: 0.8203584159499926
Epoch 397 - Training Loss: 46555856.0, Testing Loss: 47462632.0
Epoch 397 - RMSE: 6889.313188781218, R-squared: 0.8199378556664276
Epoch 398 - Training Loss: 46527872.0, Testing Loss: 47583104.0
Epoch 398 - RMSE: 6888.850046004600, R-squared: 0.8198000000000000

Epoch 398 - RMSE: 6898.050846894692, R-squared: 0.8194808234112732
Epoch 399 - Training Loss: 46483820.0, Testing Loss: 47197088.0
Epoch 399 - RMSE: 6870.013582387598, R-squared: 0.8209452887250153
Epoch 400 - Training Loss: 46458200.0, Testing Loss: 47530788.0
Epoch 400 - RMSE: 6894.257404016037, R-squared: 0.8196793145233678
Epoch 401 - Training Loss: 46424096.0, Testing Loss: 47441756.0
Epoch 401 - RMSE: 6887.797536676045, R-squared: 0.8200170744623533
Epoch 402 - Training Loss: 46384588.0, Testing Loss: 47071044.0
Epoch 402 - RMSE: 6860.834196640843, R-squared: 0.8214234578542492
Epoch 403 - Training Loss: 46350452.0, Testing Loss: 47024592.0
Epoch 403 - RMSE: 6857.447717051262, R-squared: 0.8215997036423853
Epoch 404 - Training Loss: 46312288.0, Testing Loss: 47012284.0
Epoch 404 - RMSE: 6856.550419444699, R-squared: 0.8216463879752206
Epoch 405 - Training Loss: 46283852.0, Testing Loss: 46801720.0
Epoch 405 - RMSE: 6841.178370915037, R-squared: 0.8224452115463015
Epoch 406 - Training Loss: 46246372.0, Testing Loss: 46760460.0
Epoch 406 - RMSE: 6838.161843385285, R-squared: 0.8226017579176235
Epoch 407 - Training Loss: 46213120.0, Testing Loss: 47117612.0
Epoch 407 - RMSE: 6864.22704482397, R-squared: 0.8212467933580352
Epoch 408 - Training Loss: 46175956.0, Testing Loss: 46794556.0
Epoch 408 - RMSE: 6840.654559143941, R-squared: 0.8224724003499181
Epoch 409 - Training Loss: 46140432.0, Testing Loss: 46871948.0
Epoch 409 - RMSE: 6846.308873509527, R-squared: 0.8221787992902463
Epoch 410 - Training Loss: 46102044.0, Testing Loss: 46782568.0
Epoch 410 - RMSE: 6839.778550431854, R-squared: 0.8225178655214088
Epoch 411 - Training Loss: 46069656.0, Testing Loss: 46915116.0
Epoch 411 - RMSE: 6849.46098973035, R-squared: 0.8220150199064262
Epoch 412 - Training Loss: 46033900.0, Testing Loss: 46666008.0
Epoch 412 - RMSE: 6831.252250086869, R-squared: 0.822960079482909
Epoch 413 - Training Loss: 46002948.0, Testing Loss: 46794260.0
Epoch 413 - RMSE: 6840.6331248189945, R-squared: 0.8224735128686875
Epoch 414 - Training Loss: 45965336.0, Testing Loss: 46568700.0
Epoch 414 - RMSE: 6824.126830213397, R-squared: 0.8233292141068342
Epoch 415 - Training Loss: 45942872.0, Testing Loss: 46968068.0
Epoch 415 - RMSE: 6853.3253744495767, R-squared: 0.8218141292169033
Epoch 416 - Training Loss: 45903876.0, Testing Loss: 46731744.0
Epoch 416 - RMSE: 6836.062010014082, R-squared: 0.8227106905703923
Epoch 417 - Training Loss: 45877108.0, Testing Loss: 46186004.0
Epoch 417 - RMSE: 6796.0285836952935, R-squared: 0.8247810978513384
Epoch 418 - Training Loss: 45829760.0, Testing Loss: 46498348.0
Epoch 418 - RMSE: 6818.969875999165, R-squared: 0.8235961314506348
Epoch 419 - Training Loss: 45796900.0, Testing Loss: 46309192.0
Epoch 419 - RMSE: 6805.085476738339, R-squared: 0.8243137671823496
Epoch 420 - Training Loss: 45761188.0, Testing Loss: 46372320.0
Epoch 420 - RMSE: 6809.722155347161, R-squared: 0.8240742762556225
Epoch 421 - Training Loss: 45728816.0, Testing Loss: 46602492.0
Epoch 421 - RMSE: 6826.601655732647, R-squared: 0.8232010486542506
Epoch 422 - Training Loss: 45697224.0, Testing Loss: 46615608.0
Epoch 422 - RMSE: 6827.56218700231, R-squared: 0.8231512924572345
Epoch 423 - Training Loss: 45663312.0, Testing Loss: 46506812.0
Epoch 423 - RMSE: 6819.590304800036, R-squared: 0.8235640295286036
Epoch 424 - Training Loss: 45625900.0, Testing Loss: 46460752.0
Epoch 424 - RMSE: 6816.21242300814, R-squared: 0.8237387708913508
Epoch 425 - Training Loss: 45605752.0, Testing Loss: 45782608.0
Epoch 425 - RMSE: 6766.284614425149, R-squared: 0.826311491851636
Epoch 426 - Training Loss: 45560720.0, Testing Loss: 46464572.0
Epoch 426 - RMSE: 6816.4928432745755, R-squared: 0.8237242677525154
Epoch 427 - Training Loss: 45520508.0, Testing Loss: 46291108.0
Epoch 427 - RMSE: 6803.756757046707, R-squared: 0.8243823673397088
Epoch 428 - Training Loss: 45481704.0, Testing Loss: 46083648.0
Epoch 428 - RMSE: 6788.493949557606, R-squared: 0.8251694065403848
Epoch 429 - Training Loss: 45452432.0, Testing Loss: 46183984.0
Epoch 429 - RMSE: 6795.880105815866, R-squared: 0.8247887540424532
Epoch 430 - Training Loss: 45419888.0, Testing Loss: 46243004.0
Epoch 430 - RMSE: 6800.220471603414, R-squared: 0.8245648761234299
Epoch 431 - Training Loss: 45381568.0, Testing Loss: 46059180.0
Epoch 431 - RMSE: 6786.691538668735, R-squared: 0.8252622326471621
Epoch 432 - Training Loss: 45352776.0, Testing Loss: 45699492.0
Epoch 432 - RMSE: 6760.140342117667, R-squared: 0.8266267919045259
Epoch 433 - Training Loss: 45312552.0, Testing Loss: 46086516.0
Epoch 433 - RMSE: 6788.704841356032, R-squared: 0.8251585437742819
Epoch 434 - Training Loss: 45278360.0, Testing Loss: 45691268.0
Epoch 434 - RMSE: 6758.531518888618, R-squared: 0.8266588187385176

Epoch 434 - RMSE: 6759.531518829619, R-squared: 0.8266580187395176
Epoch 435 - Training Loss: 45252600.0, Testing Loss: 46193288.0
Epoch 435 - RMSE: 6796.5643672825945, R-squared: 0.8247534690350611
Epoch 436 - Training Loss: 45208116.0, Testing Loss: 45783284.0
Epoch 436 - RMSE: 6766.334444238103, R-squared: 0.8263089336093403
Epoch 437 - Training Loss: 45175280.0, Testing Loss: 45841696.0
Epoch 437 - RMSE: 6770.6497723447, R-squared: 0.8260873149589707
Epoch 438 - Training Loss: 45141380.0, Testing Loss: 45613208.0
Epoch 438 - RMSE: 6753.754768124345, R-squared: 0.826954171077093
Epoch 439 - Training Loss: 45107256.0, Testing Loss: 45793792.0
Epoch 439 - RMSE: 6767.111220957219, R-squared: 0.8262690517731177
Epoch 440 - Training Loss: 45077716.0, Testing Loss: 45408928.0
Epoch 440 - RMSE: 6738.614534678902, R-squared: 0.8277291526079806
Epoch 441 - Training Loss: 45061040.0, Testing Loss: 46157076.0
Epoch 441 - RMSE: 6793.8998314073515, R-squared: 0.8248908499562144
Epoch 442 - Training Loss: 45003780.0, Testing Loss: 45482940.0
Epoch 442 - RMSE: 6744.104015615612, R-squared: 0.8274483641115555
Epoch 443 - Training Loss: 44976360.0, Testing Loss: 45829436.0
Epoch 443 - RMSE: 6769.744166515953, R-squared: 0.8261338351050802
Epoch 444 - Training Loss: 44936876.0, Testing Loss: 45446092.0
Epoch 444 - RMSE: 6741.371926610128, R-squared: 0.8275881398139886
Epoch 445 - Training Loss: 44902876.0, Testing Loss: 45478128.0
Epoch 445 - RMSE: 6743.747410520959, R-squared: 0.827466611506757
Epoch 446 - Training Loss: 44876276.0, Testing Loss: 45260752.0
Epoch 446 - RMSE: 6727.611034635701, R-squared: 0.8282912962404798
Epoch 447 - Training Loss: 44840860.0, Testing Loss: 45639004.0
Epoch 447 - RMSE: 6755.664660737609, R-squared: 0.8268562860656817
Epoch 448 - Training Loss: 44810352.0, Testing Loss: 45498092.0
Epoch 448 - RMSE: 6745.227391630262, R-squared: 0.8273908749290801
Epoch 449 - Training Loss: 44777364.0, Testing Loss: 45279032.0
Epoch 449 - RMSE: 6728.969619644913, R-squared: 0.8282219389532519
Epoch 450 - Training Loss: 44745876.0, Testing Loss: 45123156.0
Epoch 450 - RMSE: 6717.377037413798, R-squared: 0.8288133031809006
Epoch 451 - Training Loss: 44724280.0, Testing Loss: 45595552.0
Epoch 451 - RMSE: 6752.448192805279, R-squared: 0.8270211191812511
Epoch 452 - Training Loss: 44687392.0, Testing Loss: 44960672.0
Epoch 452 - RMSE: 6705.272039175363, R-squared: 0.8294297186485943
Epoch 453 - Training Loss: 44649276.0, Testing Loss: 45060240.0
Epoch 453 - RMSE: 6712.692554826921, R-squared: 0.8290519801165271
Epoch 454 - Training Loss: 44615764.0, Testing Loss: 45189036.0
Epoch 454 - RMSE: 6722.279479219378, R-squared: 0.8285633428000334
Epoch 455 - Training Loss: 44586944.0, Testing Loss: 45257540.0
Epoch 455 - RMSE: 6727.372255934209, R-squared: 0.8283034847137752
Epoch 456 - Training Loss: 44561856.0, Testing Loss: 45302116.0
Epoch 456 - RMSE: 6730.6844479103465, R-squared: 0.8281343750539936
Epoch 457 - Training Loss: 44524100.0, Testing Loss: 44960428.0
Epoch 457 - RMSE: 6705.253711194168, R-squared: 0.8294306511102806
Epoch 458 - Training Loss: 44489584.0, Testing Loss: 45139232.0
Epoch 458 - RMSE: 6718.573731021908, R-squared: 0.8287523042903051
Epoch 459 - Training Loss: 44460716.0, Testing Loss: 45089096.0
Epoch 459 - RMSE: 6714.8412425970855, R-squared: 0.828942523976829
Epoch 460 - Training Loss: 44437956.0, Testing Loss: 45287916.0
Epoch 460 - RMSE: 6729.630182832479, R-squared: 0.8281882114022318
Epoch 461 - Training Loss: 44397204.0, Testing Loss: 44764732.0
Epoch 461 - RMSE: 6690.645294178527, R-squared: 0.8301730641372331
Epoch 462 - Training Loss: 44359256.0, Testing Loss: 44877388.0
Epoch 462 - RMSE: 6699.0584670396465, R-squared: 0.8297456967850317
Epoch 463 - Training Loss: 44328832.0, Testing Loss: 44787628.0
Epoch 463 - RMSE: 6692.355915204544, R-squared: 0.8300862125250802
Epoch 464 - Training Loss: 44300236.0, Testing Loss: 45019972.0
Epoch 464 - RMSE: 6709.69238222546, R-squared: 0.8292047530759368
Epoch 465 - Training Loss: 44267304.0, Testing Loss: 44939008.0
Epoch 465 - RMSE: 6703.656275638273, R-squared: 0.8295119130871834
Epoch 466 - Training Loss: 44234608.0, Testing Loss: 44710204.0
Epoch 466 - RMSE: 6686.568752376487, R-squared: 0.8303799487246107
Epoch 467 - Training Loss: 44203176.0, Testing Loss: 44843172.0
Epoch 467 - RMSE: 6696.504659892047, R-squared: 0.8298754803306644
Epoch 468 - Training Loss: 44170016.0, Testing Loss: 44704168.0
Epoch 468 - RMSE: 6686.117672067383, R-squared: 0.8304028333122697
Epoch 469 - Training Loss: 44138544.0, Testing Loss: 44796196.0
Epoch 469 - RMSE: 6692.9963417409135, R-squared: 0.8300536910912469
Epoch 470 - Training Loss: 44114272.0, Testing Loss: 44852868.0
Epoch 470 - RMSE: 6687.887888888889, R-squared: 0.8300287551888889

Epoch 470 - RMSE: 6697.227999233, R-squared: 0.8298387255129257
Epoch 471 - Training Loss: 44072196.0, Testing Loss: 44539672.0
Epoch 471 - RMSE: 6673.804903760431, R-squared: 0.8310268988633733
Epoch 472 - Training Loss: 44044376.0, Testing Loss: 44722708.0
Epoch 472 - RMSE: 6687.5038510310915, R-squared: 0.830332503591446
Epoch 473 - Training Loss: 44010512.0, Testing Loss: 44415020.0
Epoch 473 - RMSE: 6664.459615661764, R-squared: 0.8314997915325955
Epoch 474 - Training Loss: 44000372.0, Testing Loss: 44951552.0
Epoch 474 - RMSE: 6704.591777903904, R-squared: 0.8294643261842609
Epoch 475 - Training Loss: 43947004.0, Testing Loss: 44479504.0
Epoch 475 - RMSE: 6669.2953071995325, R-squared: 0.8312551773578141
Epoch 476 - Training Loss: 43921032.0, Testing Loss: 44426348.0
Epoch 476 - RMSE: 6665.30911854883, R-squared: 0.8314568321496092
Epoch 477 - Training Loss: 43897652.0, Testing Loss: 44146740.0
Epoch 477 - RMSE: 6644.301447678567, R-squared: 0.8325175840397213
Epoch 478 - Training Loss: 43851664.0, Testing Loss: 44321680.0
Epoch 478 - RMSE: 6657.452882243538, R-squared: 0.8318539133891544
Epoch 479 - Training Loss: 43820340.0, Testing Loss: 44389468.0
Epoch 479 - RMSE: 6662.541962807195, R-squared: 0.8315967471556767
Epoch 480 - Training Loss: 43790820.0, Testing Loss: 44303768.0
Epoch 480 - RMSE: 6656.107535917056, R-squared: 0.8319218648616047
Epoch 481 - Training Loss: 43762604.0, Testing Loss: 44318732.0
Epoch 481 - RMSE: 6657.231214166248, R-squared: 0.8318651104640307
Epoch 482 - Training Loss: 43740984.0, Testing Loss: 44588480.0
Epoch 482 - RMSE: 6677.460736331836, R-squared: 0.8308417251669877
Epoch 483 - Training Loss: 43717880.0, Testing Loss: 44647312.0
Epoch 483 - RMSE: 6681.864401175515, R-squared: 0.8306185379385586
Epoch 484 - Training Loss: 43679236.0, Testing Loss: 44456888.0
Epoch 484 - RMSE: 6667.599735318178, R-squared: 0.8313409683124541
Epoch 485 - Training Loss: 43637012.0, Testing Loss: 44141268.0
Epoch 485 - RMSE: 6643.889824375137, R-squared: 0.8325383349133578
Epoch 486 - Training Loss: 43607404.0, Testing Loss: 44142744.0
Epoch 486 - RMSE: 6644.000585791837, R-squared: 0.8325327513030425
Epoch 487 - Training Loss: 43584400.0, Testing Loss: 44263680.0
Epoch 487 - RMSE: 6653.095711311666, R-squared: 0.8320739379253425
Epoch 488 - Training Loss: 43566932.0, Testing Loss: 44436048.0
Epoch 488 - RMSE: 6666.03678880158, R-squared: 0.8314200294921325
Epoch 489 - Training Loss: 43528044.0, Testing Loss: 44181568.0
Epoch 489 - RMSE: 6646.921478468936, R-squared: 0.8323854721518538
Epoch 490 - Training Loss: 43491900.0, Testing Loss: 43979048.0
Epoch 490 - RMSE: 6631.669983051945, R-squared: 0.8331537795217465
Epoch 491 - Training Loss: 43463764.0, Testing Loss: 43885560.0
Epoch 491 - RMSE: 6624.617783691402, R-squared: 0.8335084434870753
Epoch 492 - Training Loss: 43436692.0, Testing Loss: 43849524.0
Epoch 492 - RMSE: 6621.897164004928, R-squared: 0.8336451659998236
Epoch 493 - Training Loss: 43403576.0, Testing Loss: 43944228.0
Epoch 493 - RMSE: 6629.0442626329905, R-squared: 0.8332858743940288
Epoch 494 - Training Loss: 43375772.0, Testing Loss: 43750068.0
Epoch 494 - RMSE: 6614.38288224186, R-squared: 0.8340224983010244
Epoch 495 - Training Loss: 43345236.0, Testing Loss: 43999732.0
Epoch 495 - RMSE: 6633.229282509405, R-squared: 0.8330753094507916
Epoch 496 - Training Loss: 43317708.0, Testing Loss: 44067196.0
Epoch 496 - RMSE: 6638.312674853062, R-squared: 0.8328193650835536
Epoch 497 - Training Loss: 43286456.0, Testing Loss: 43738320.0
Epoch 497 - RMSE: 6613.495433408937, R-squared: 0.8340670335695265
Epoch 498 - Training Loss: 43255288.0, Testing Loss: 43767712.0
Epoch 498 - RMSE: 6615.7170035224735, R-squared: 0.8339555362116814
Epoch 499 - Training Loss: 43231684.0, Testing Loss: 43710688.0
Epoch 499 - RMSE: 6611.405878794885, R-squared: 0.8341718710868533
Epoch 500 - Training Loss: 43195284.0, Testing Loss: 43894976.0
Epoch 500 - RMSE: 6625.3281112819195, R-squared: 0.8334727373103654
Epoch 501 - Training Loss: 43178088.0, Testing Loss: 44048740.0
Epoch 501 - RMSE: 6636.922599300434, R-squared: 0.8328893736513945
Epoch 502 - Training Loss: 43142256.0, Testing Loss: 43883468.0
Epoch 502 - RMSE: 6624.45980878013, R-squared: 0.8335163839226221
Epoch 503 - Training Loss: 43115808.0, Testing Loss: 43541852.0
Epoch 503 - RMSE: 6598.624733459477, R-squared: 0.8348124079941557
Epoch 504 - Training Loss: 43086876.0, Testing Loss: 43819668.0
Epoch 504 - RMSE: 6619.642736187221, R-squared: 0.8337584178718123
Epoch 505 - Training Loss: 43057652.0, Testing Loss: 43797204.0
Epoch 505 - RMSE: 6617.94574781683, R-squared: 0.8338436411632858
Epoch 506 - Training Loss: 43027868.0, Testing Loss: 43811632.0
Epoch 506 - RMSE: 6618.825878884888, R-squared: 0.8337888868888145

Epoch 506 - RMSE: 6619.035878024828, R-squared: 0.8337888969900145
Epoch 507 - Training Loss: 43004000.0, Testing Loss: 43862008.0
Epoch 507 - RMSE: 6622.839783203798, R-squared: 0.8335978018027437
Epoch 508 - Training Loss: 42972896.0, Testing Loss: 43514348.0
Epoch 508 - RMSE: 6596.54074275343, R-squared: 0.8349167312613921
Epoch 509 - Training Loss: 42939992.0, Testing Loss: 43583088.0
Epoch 509 - RMSE: 6601.749000817817, R-squared: 0.8346559473982536
Epoch 510 - Training Loss: 42911476.0, Testing Loss: 43535860.0
Epoch 510 - RMSE: 6598.171121608711, R-squared: 0.8348351183245208
Epoch 511 - Training Loss: 42886012.0, Testing Loss: 43644056.0
Epoch 511 - RMSE: 6606.364963235982, R-squared: 0.8344246484632901
Epoch 512 - Training Loss: 42873004.0, Testing Loss: 43811916.0
Epoch 512 - RMSE: 6619.057225524981, R-squared: 0.8337878248709525
Epoch 513 - Training Loss: 42834420.0, Testing Loss: 43303512.0
Epoch 513 - RMSE: 6580.540102881321, R-squared: 0.8357166154688312
Epoch 514 - Training Loss: 42800300.0, Testing Loss: 43516704.0
Epoch 514 - RMSE: 6596.718961625606, R-squared: 0.8349078110249983
Epoch 515 - Training Loss: 42774740.0, Testing Loss: 43576576.0
Epoch 515 - RMSE: 6601.2557590403785, R-squared: 0.8346806534413815
Epoch 516 - Training Loss: 42748896.0, Testing Loss: 43272356.0
Epoch 516 - RMSE: 6578.172696270078, R-squared: 0.8358347989628596
Epoch 517 - Training Loss: 42724008.0, Testing Loss: 43408168.0
Epoch 517 - RMSE: 6588.4874776116385, R-squared: 0.8353195629462042
Epoch 518 - Training Loss: 42701404.0, Testing Loss: 43411760.0
Epoch 518 - RMSE: 6588.760075715399, R-squared: 0.8353059353864002
Epoch 519 - Training Loss: 42672764.0, Testing Loss: 43469900.0
Epoch 519 - RMSE: 6593.170633958489, R-squared: 0.8350853670603703
Epoch 520 - Training Loss: 42643068.0, Testing Loss: 43260076.0
Epoch 520 - RMSE: 6577.239676076344, R-squared: 0.8358813646558854
Epoch 521 - Training Loss: 42619580.0, Testing Loss: 43345536.0
Epoch 521 - RMSE: 6583.732649382797, R-squared: 0.8355571727597109
Epoch 522 - Training Loss: 42590780.0, Testing Loss: 43211740.0
Epoch 522 - RMSE: 6573.563812106155, R-squared: 0.8360647574557063
Epoch 523 - Training Loss: 42567124.0, Testing Loss: 43131064.0
Epoch 523 - RMSE: 6567.424547806227, R-squared: 0.8363708233391467
Epoch 524 - Training Loss: 42539060.0, Testing Loss: 43259884.0
Epoch 524 - RMSE: 6577.224675624449, R-squared: 0.8358821132528679
Epoch 525 - Training Loss: 42518624.0, Testing Loss: 43108588.0
Epoch 525 - RMSE: 6565.71321428862, R-squared: 0.8364560889126537
Epoch 526 - Training Loss: 42489988.0, Testing Loss: 43160672.0
Epoch 526 - RMSE: 6569.678056791467, R-squared: 0.836258510489317
Epoch 527 - Training Loss: 42462368.0, Testing Loss: 43119864.0
Epoch 527 - RMSE: 6566.572018025307, R-squared: 0.8364133026065727
Epoch 528 - Training Loss: 42447184.0, Testing Loss: 43416124.0
Epoch 528 - RMSE: 6589.091243176093, R-squared: 0.8352893791041154
Epoch 529 - Training Loss: 42412808.0, Testing Loss: 43000992.0
Epoch 529 - RMSE: 6557.51388319981, R-squared: 0.8368643045426202
Epoch 530 - Training Loss: 42384852.0, Testing Loss: 43103556.0
Epoch 530 - RMSE: 6565.329769496152, R-squared: 0.8364751906394065
Epoch 531 - Training Loss: 42384980.0, Testing Loss: 43527968.0
Epoch 531 - RMSE: 6597.573252797739, R-squared: 0.8348650485751338
Epoch 532 - Training Loss: 42336680.0, Testing Loss: 43006344.0
Epoch 532 - RMSE: 6557.922149543768, R-squared: 0.8368439904758984
Epoch 533 - Training Loss: 42318996.0, Testing Loss: 42757796.0
Epoch 533 - RMSE: 6538.944866823356, R-squared: 0.8377869043080916
Epoch 534 - Training Loss: 42283512.0, Testing Loss: 43110000.0
Epoch 534 - RMSE: 6565.820444340824, R-squared: 0.8364507469293062
Epoch 535 - Training Loss: 42259380.0, Testing Loss: 43097376.0
Epoch 535 - RMSE: 6564.858841979645, R-squared: 0.8364986488884756
Epoch 536 - Training Loss: 42237124.0, Testing Loss: 43146572.0
Epoch 536 - RMSE: 6568.604903654458, R-squared: 0.8363120002767168
Epoch 537 - Training Loss: 42211816.0, Testing Loss: 42784828.0
Epoch 537 - RMSE: 6541.01147086593, R-squared: 0.8376843546704522
Epoch 538 - Training Loss: 42182268.0, Testing Loss: 43012712.0
Epoch 538 - RMSE: 6558.407647101374, R-squared: 0.836819831977386
Epoch 539 - Training Loss: 42173048.0, Testing Loss: 43322896.0
Epoch 539 - RMSE: 6582.012855357267, R-squared: 0.8356430726191211
Epoch 540 - Training Loss: 42129280.0, Testing Loss: 42924960.0
Epoch 540 - RMSE: 6551.714353493058, R-squared: 0.8371527345648064
Epoch 541 - Training Loss: 42122648.0, Testing Loss: 43263224.0
Epoch 541 - RMSE: 6577.478479400916, R-squared: 0.8358694469550996
Epoch 542 - Training Loss: 42082112.0, Testing Loss: 42998012.0
Epoch 542 - RMSE: 6557.000000000000, R-squared: 0.8360750000000000

Epoch 542 - RMSE: 6557.7286990815193, R-squared: 0.8368755934570669
Epoch 543 - Training Loss: 42061224.0, Testing Loss: 43047008.0
Epoch 543 - RMSE: 6561.021581858395, R-squared: 0.8366897310938566
Epoch 544 - Training Loss: 42033924.0, Testing Loss: 42743504.0
Epoch 544 - RMSE: 6537.8515765187885, R-squared: 0.8378411427770092
Epoch 545 - Training Loss: 42014732.0, Testing Loss: 42544364.0
Epoch 545 - RMSE: 6522.603929752992, R-squared: 0.8385966379738143
Epoch 546 - Training Loss: 41983332.0, Testing Loss: 42818504.0
Epoch 546 - RMSE: 6543.584924636708, R-squared: 0.8375566086842776
Epoch 547 - Training Loss: 41992084.0, Testing Loss: 43324808.0
Epoch 547 - RMSE: 6582.158356360377, R-squared: 0.835635806038928
Epoch 548 - Training Loss: 41948948.0, Testing Loss: 42413108.0
Epoch 548 - RMSE: 6512.534371631033, R-squared: 0.8390946004497206
Epoch 549 - Training Loss: 41910788.0, Testing Loss: 42734080.0
Epoch 549 - RMSE: 6537.130929497313, R-squared: 0.8378768893385753
Epoch 550 - Training Loss: 41887608.0, Testing Loss: 42732176.0
Epoch 550 - RMSE: 6536.985491414886, R-squared: 0.8378841030879386
Epoch 551 - Training Loss: 41863824.0, Testing Loss: 42741208.0
Epoch 551 - RMSE: 6537.675742210605, R-squared: 0.8378498651246228
Epoch 552 - Training Loss: 41836708.0, Testing Loss: 42641636.0
Epoch 552 - RMSE: 6530.056726804752, R-squared: 0.8382275848347503
Epoch 553 - Training Loss: 41819144.0, Testing Loss: 42766676.0
Epoch 553 - RMSE: 6539.623482341655, R-squared: 0.83775323342132
Epoch 554 - Training Loss: 41792716.0, Testing Loss: 42672596.0
Epoch 554 - RMSE: 6532.426316822721, R-squared: 0.8381101574164939
Epoch 555 - Training Loss: 41766272.0, Testing Loss: 42497740.0
Epoch 555 - RMSE: 6519.0287024304625, R-squared: 0.8387735291559824
Epoch 556 - Training Loss: 41740848.0, Testing Loss: 42595576.0
Epoch 556 - RMSE: 6526.528918473679, R-squared: 0.8384023299983301
Epoch 557 - Training Loss: 41718280.0, Testing Loss: 42640212.0
Epoch 557 - RMSE: 6529.946921564537, R-squared: 0.8382330253110896
Epoch 558 - Training Loss: 41694508.0, Testing Loss: 42416864.0
Epoch 558 - RMSE: 6512.8227266374315, R-squared: 0.8390803513411411
Epoch 559 - Training Loss: 41672680.0, Testing Loss: 42374528.0
Epoch 559 - RMSE: 6509.5719900609165, R-squared: 0.839240950473277
Epoch 560 - Training Loss: 41646356.0, Testing Loss: 42371420.0
Epoch 560 - RMSE: 6509.333020521942, R-squared: 0.8392527533416885
Epoch 561 - Training Loss: 41620664.0, Testing Loss: 42430988.0
Epoch 561 - RMSE: 6513.907277998992, R-squared: 0.8390267524139575
Epoch 562 - Training Loss: 41595132.0, Testing Loss: 42386868.0
Epoch 562 - RMSE: 6510.520113748698, R-squared: 0.8391941177281703
Epoch 563 - Training Loss: 41587828.0, Testing Loss: 42761504.0
Epoch 563 - RMSE: 6539.227980625947, R-squared: 0.8377728574667498
Epoch 564 - Training Loss: 41556444.0, Testing Loss: 42639424.0
Epoch 564 - RMSE: 6529.887214809137, R-squared: 0.8382359835394332
Epoch 565 - Training Loss: 41529016.0, Testing Loss: 42339508.0
Epoch 565 - RMSE: 6506.881778752471, R-squared: 0.8393737968259944
Epoch 566 - Training Loss: 41502828.0, Testing Loss: 42305632.0
Epoch 566 - RMSE: 6504.277893046256, R-squared: 0.839502328003243
Epoch 567 - Training Loss: 41487524.0, Testing Loss: 42108776.0
Epoch 567 - RMSE: 6489.12745119782, R-squared: 0.8402491530023842
Epoch 568 - Training Loss: 41458656.0, Testing Loss: 42456580.0
Epoch 568 - RMSE: 6515.871124627301, R-squared: 0.8389296756795808
Epoch 569 - Training Loss: 41437728.0, Testing Loss: 42513416.0
Epoch 569 - RMSE: 6520.231157343691, R-squared: 0.8387140462328068
Epoch 570 - Training Loss: 41407576.0, Testing Loss: 42345780.0
Epoch 570 - RMSE: 6507.363174866827, R-squared: 0.8393500288544692
Epoch 571 - Training Loss: 41389360.0, Testing Loss: 42388160.0
Epoch 571 - RMSE: 6510.618823162966, R-squared: 0.8391892415663577
Epoch 572 - Training Loss: 41365536.0, Testing Loss: 42314856.0
Epoch 572 - RMSE: 6504.98719988507, R-squared: 0.8394673207954921
Epoch 573 - Training Loss: 41340276.0, Testing Loss: 42315820.0
Epoch 573 - RMSE: 6505.061079806937, R-squared: 0.839463674298187
Epoch 574 - Training Loss: 41314560.0, Testing Loss: 42280436.0
Epoch 574 - RMSE: 6502.340992053624, R-squared: 0.8395979025831735
Epoch 575 - Training Loss: 41303812.0, Testing Loss: 41974960.0
Epoch 575 - RMSE: 6478.808501487199, R-squared: 0.840756817641489
Epoch 576 - Training Loss: 41269864.0, Testing Loss: 42176588.0
Epoch 576 - RMSE: 6494.350584363812, R-squared: 0.8399918808929976
Epoch 577 - Training Loss: 41247416.0, Testing Loss: 42144152.0
Epoch 577 - RMSE: 6491.852540617536, R-squared: 0.8401149510607216
Epoch 578 - Training Loss: 41234296.0, Testing Loss: 42478268.0
Epoch 578 - RMSE: 6517.535622455225, R-squared: 0.8399473738882722

Epoch 578 - RMSE: 6517.5356332458305, R-squared: 0.8388473728893799
Epoch 579 - Training Loss: 41204024.0, Testing Loss: 42090608.0
Epoch 579 - RMSE: 6487.727435942232, R-squared: 0.8403180773680029
Epoch 580 - Training Loss: 41183580.0, Testing Loss: 42193952.0
Epoch 580 - RMSE: 6495.687084229562, R-squared: 0.8399260166217173
Epoch 581 - Training Loss: 41170548.0, Testing Loss: 42451872.0
Epoch 581 - RMSE: 6515.5097053741565, R-squared: 0.8389475435289335
Epoch 582 - Training Loss: 41140000.0, Testing Loss: 41885248.0
Epoch 582 - RMSE: 6471.881518846555, R-squared: 0.8410971533897641
Epoch 583 - Training Loss: 41112732.0, Testing Loss: 42134312.0
Epoch 583 - RMSE: 6491.095179723055, R-squared: 0.8401522543172273
Epoch 584 - Training Loss: 41112496.0, Testing Loss: 42494396.0
Epoch 584 - RMSE: 6518.772903767973, R-squared: 0.8387861815642932
Epoch 585 - Training Loss: 41067400.0, Testing Loss: 42067440.0
Epoch 585 - RMSE: 6485.94140943301, R-squared: 0.8404059839249339
Epoch 586 - Training Loss: 41048844.0, Testing Loss: 41914368.0
Epoch 586 - RMSE: 6474.130935092639, R-squared: 0.8409866752357013
Epoch 587 - Training Loss: 41024656.0, Testing Loss: 41954616.0
Epoch 587 - RMSE: 6477.238295722461, R-squared: 0.8408339967284905
Epoch 588 - Training Loss: 40999952.0, Testing Loss: 42072056.0
Epoch 588 - RMSE: 6486.2977372003, R-squared: 0.8403884477376804
Epoch 589 - Training Loss: 40979852.0, Testing Loss: 42046504.0
Epoch 589 - RMSE: 6484.327554345524, R-squared: 0.8404853955491897
Epoch 590 - Training Loss: 40967012.0, Testing Loss: 42240824.0
Epoch 590 - RMSE: 6499.294063957551, R-squared: 0.8397481928094714
Epoch 591 - Training Loss: 40936476.0, Testing Loss: 41914916.0
Epoch 591 - RMSE: 6474.173144227738, R-squared: 0.8409846018031883
Epoch 592 - Training Loss: 40923936.0, Testing Loss: 42173048.0
Epoch 592 - RMSE: 6494.078256396001, R-squared: 0.8400052998705331
Epoch 593 - Training Loss: 40893532.0, Testing Loss: 41923200.0
Epoch 593 - RMSE: 6474.812596111066, R-squared: 0.8409531884581409
Epoch 594 - Training Loss: 40873896.0, Testing Loss: 42062780.0
Epoch 594 - RMSE: 6485.582446700154, R-squared: 0.8404236488143427
Epoch 595 - Training Loss: 40856980.0, Testing Loss: 42041148.0
Epoch 595 - RMSE: 6483.914495264449, R-squared: 0.8405057174273733
Epoch 596 - Training Loss: 40834948.0, Testing Loss: 41769028.0
Epoch 596 - RMSE: 6462.896458360922, R-squared: 0.8415380639947827
Epoch 597 - Training Loss: 40812544.0, Testing Loss: 41976448.0
Epoch 597 - RMSE: 6478.923610480888, R-squared: 0.8407511590438299
Epoch 598 - Training Loss: 40788892.0, Testing Loss: 41746712.0
Epoch 598 - RMSE: 6461.169484696649, R-squared: 0.841622739040795
Epoch 599 - Training Loss: 40771464.0, Testing Loss: 42081060.0
Epoch 599 - RMSE: 6486.991802101929, R-squared: 0.8403542875101222
Epoch 600 - Training Loss: 40746980.0, Testing Loss: 41790112.0
Epoch 600 - RMSE: 6464.52740414582, R-squared: 0.8414580765037374
Epoch 601 - Training Loss: 40722684.0, Testing Loss: 41874408.0
Epoch 601 - RMSE: 6471.044010148981, R-squared: 0.8411382771046508
Epoch 602 - Training Loss: 40709376.0, Testing Loss: 42022304.0
Epoch 602 - RMSE: 6482.461161196117, R-squared: 0.8405772089612468
Epoch 603 - Training Loss: 40707848.0, Testing Loss: 42218016.0
Epoch 603 - RMSE: 6497.539107426208, R-squared: 0.83983472435675
Epoch 604 - Training Loss: 40664636.0, Testing Loss: 41688764.0
Epoch 604 - RMSE: 6456.683944571805, R-squared: 0.8418425633210043
Epoch 605 - Training Loss: 40655456.0, Testing Loss: 41488852.0
Epoch 605 - RMSE: 6441.1840454074445, R-squared: 0.8426009965663427
Epoch 606 - Training Loss: 40621564.0, Testing Loss: 41835752.0
Epoch 606 - RMSE: 6468.056478161047, R-squared: 0.841284928841553
Epoch 607 - Training Loss: 40620648.0, Testing Loss: 42048344.0
Epoch 607 - RMSE: 6484.469387188189, R-squared: 0.8404784172905991
Epoch 608 - Training Loss: 40590412.0, Testing Loss: 41522152.0
Epoch 608 - RMSE: 6443.768408788169, R-squared: 0.8424746664313424
Epoch 609 - Training Loss: 40563804.0, Testing Loss: 41643388.0
Epoch 609 - RMSE: 6453.168826980187, R-squared: 0.8420147231048878
Epoch 610 - Training Loss: 40545392.0, Testing Loss: 41563312.0
Epoch 610 - RMSE: 6446.9616894331475, R-squared: 0.8423185009064311
Epoch 611 - Training Loss: 40518940.0, Testing Loss: 41632956.0
Epoch 611 - RMSE: 6452.360310340289, R-squared: 0.8420543085323833
Epoch 612 - Training Loss: 40503576.0, Testing Loss: 41858952.0
Epoch 612 - RMSE: 6469.849594089781, R-squared: 0.8411969166320923
Epoch 613 - Training Loss: 40479664.0, Testing Loss: 41693240.0
Epoch 613 - RMSE: 6457.030778252957, R-squared: 0.8418255713790909
Epoch 614 - Training Loss: 40461636.0, Testing Loss: 41673636.0
Epoch 614 - RMSE: 6455.511000640674, R-squared: 0.8410000750115046

Epoch 614 - RMSE: 6455.511920648674, R-squared: 0.8418999759115046
Epoch 615 - Training Loss: 40441032.0, Testing Loss: 41561472.0
Epoch 615 - RMSE: 6446.8187156845925, R-squared: 0.8423254946086144
Epoch 616 - Training Loss: 40427860.0, Testing Loss: 41829556.0
Epoch 616 - RMSE: 6467.577637017191, R-squared: 0.8413084278611732
Epoch 617 - Training Loss: 40398636.0, Testing Loss: 41600908.0
Epoch 617 - RMSE: 6449.876778649195, R-squared: 0.8421758726173927
Epoch 618 - Training Loss: 40380572.0, Testing Loss: 41515336.0
Epoch 618 - RMSE: 6443.239656479505, R-squared: 0.8425005172879214
Epoch 619 - Training Loss: 40360844.0, Testing Loss: 41503744.0
Epoch 619 - RMSE: 6442.339722143286, R-squared: 0.8425445104657486
Epoch 620 - Training Loss: 40346128.0, Testing Loss: 41716624.0
Epoch 620 - RMSE: 6458.8409495950755, R-squared: 0.8417368733500395
Epoch 621 - Training Loss: 40319884.0, Testing Loss: 41598672.0
Epoch 621 - RMSE: 6449.703191961421, R-squared: 0.8421843676010348
Epoch 622 - Training Loss: 40305960.0, Testing Loss: 41370532.0
Epoch 622 - RMSE: 6431.993115780739, R-squared: 0.8430498615717996
Epoch 623 - Training Loss: 40283036.0, Testing Loss: 41637224.0
Epoch 623 - RMSE: 6452.6915204944335, R-squared: 0.8420380928974953
Epoch 624 - Training Loss: 40265548.0, Testing Loss: 41417548.0
Epoch 624 - RMSE: 6435.646731195985, R-squared: 0.8428715036969157
Epoch 625 - Training Loss: 40244852.0, Testing Loss: 41526700.0
Epoch 625 - RMSE: 6444.121501015475, R-squared: 0.8424574024667616
Epoch 626 - Training Loss: 40222916.0, Testing Loss: 41420552.0
Epoch 626 - RMSE: 6435.879560634893, R-squared: 0.8428601342719204
Epoch 627 - Training Loss: 40219256.0, Testing Loss: 41764132.0
Epoch 627 - RMSE: 6462.517384380054, R-squared: 0.8415566522657385
Epoch 628 - Training Loss: 40186816.0, Testing Loss: 41512140.0
Epoch 628 - RMSE: 6442.991416764889, R-squared: 0.8425126530691633
Epoch 629 - Training Loss: 40173628.0, Testing Loss: 41651720.0
Epoch 629 - RMSE: 6453.814877318413, R-squared: 0.8419830885534196
Epoch 630 - Training Loss: 40148352.0, Testing Loss: 41392412.0
Epoch 630 - RMSE: 6433.693632747468, R-squared: 0.8429668603464853
Epoch 631 - Training Loss: 40129560.0, Testing Loss: 41364384.0
Epoch 631 - RMSE: 6431.514909775039, R-squared: 0.8430731985708803
Epoch 632 - Training Loss: 40126788.0, Testing Loss: 41742672.0
Epoch 632 - RMSE: 6460.856744355543, R-squared: 0.8416380705562454
Epoch 633 - Training Loss: 40092304.0, Testing Loss: 41283204.0
Epoch 633 - RMSE: 6425.200940276305, R-squared: 0.843381164793638
Epoch 634 - Training Loss: 40072268.0, Testing Loss: 41394856.0
Epoch 634 - RMSE: 6433.883062519304, R-squared: 0.8429576130333752
Epoch 635 - Training Loss: 40055296.0, Testing Loss: 41424088.0
Epoch 635 - RMSE: 6436.15458946242, R-squared: 0.8428467036550005
Epoch 636 - Training Loss: 40037340.0, Testing Loss: 41544972.0
Epoch 636 - RMSE: 6445.539084676558, R-squared: 0.8423880821175722
Epoch 637 - Training Loss: 40016924.0, Testing Loss: 41314936.0
Epoch 637 - RMSE: 6427.6695644513175, R-squared: 0.8432607927397461
Epoch 638 - Training Loss: 40002488.0, Testing Loss: 41562796.0
Epoch 638 - RMSE: 6446.921373920033, R-squared: 0.8423204729952922
Epoch 639 - Training Loss: 39975692.0, Testing Loss: 41410256.0
Epoch 639 - RMSE: 6435.080121031914, R-squared: 0.8428991704373544
Epoch 640 - Training Loss: 39960996.0, Testing Loss: 41190352.0
Epoch 640 - RMSE: 6417.971175979187, R-squared: 0.8437334277720451
Epoch 641 - Training Loss: 39942068.0, Testing Loss: 41157660.0
Epoch 641 - RMSE: 6415.4232734146935, R-squared: 0.8438574772440759
Epoch 642 - Training Loss: 39922560.0, Testing Loss: 41198240.0
Epoch 642 - RMSE: 6418.585081679448, R-squared: 0.8437035312439949
Epoch 643 - Training Loss: 39902268.0, Testing Loss: 41322468.0
Epoch 643 - RMSE: 6428.255580284851, R-squared: 0.843232211356287
Epoch 644 - Training Loss: 39886588.0, Testing Loss: 41385780.0
Epoch 644 - RMSE: 6433.177477988407, R-squared: 0.8429920558735529
Epoch 645 - Training Loss: 39874492.0, Testing Loss: 41446380.0
Epoch 645 - RMSE: 6437.886327756527, R-squared: 0.842762123649898
Epoch 646 - Training Loss: 39858784.0, Testing Loss: 41511924.0
Epoch 646 - RMSE: 6442.975025186595, R-squared: 0.8425134543934946
Epoch 647 - Training Loss: 39831184.0, Testing Loss: 41098900.0
Epoch 647 - RMSE: 6410.842105327516, R-squared: 0.8440803962046279
Epoch 648 - Training Loss: 39813828.0, Testing Loss: 41382348.0
Epoch 648 - RMSE: 6432.91131825868, R-squared: 0.8430050473781848
Epoch 649 - Training Loss: 39794512.0, Testing Loss: 41063252.0
Epoch 649 - RMSE: 6408.061672773851, R-squared: 0.8442156139883941
Epoch 650 - Training Loss: 39773924.0, Testing Loss: 41109260.0
Epoch 650 - RMSE: 6411.650400010005, R-squared: 0.8440410761104100

Epoch 650 - RMSE: 6411.650403219395, R-squared: 0.8440410761184163
Epoch 651 - Training Loss: 39765248.0, Testing Loss: 41459748.0
Epoch 651 - RMSE: 6438.924527056104, R-squared: 0.8427114059430318
Epoch 652 - Training Loss: 39739272.0, Testing Loss: 41081748.0
Epoch 652 - RMSE: 6409.504157016856, R-squared: 0.8441454705266214
Epoch 653 - Training Loss: 39721252.0, Testing Loss: 41237848.0
Epoch 653 - RMSE: 6421.669663796434, R-squared: 0.8435532722289415
Epoch 654 - Training Loss: 39700616.0, Testing Loss: 41079564.0
Epoch 654 - RMSE: 6409.333665482051, R-squared: 0.8441537618152708
Epoch 655 - Training Loss: 39690564.0, Testing Loss: 41270956.0
Epoch 655 - RMSE: 6424.247424391546, R-squared: 0.8434276465978657
Epoch 656 - Training Loss: 39664284.0, Testing Loss: 41033952.0
Epoch 656 - RMSE: 6405.774765164076, R-squared: 0.8443267867405448
Epoch 657 - Training Loss: 39648364.0, Testing Loss: 41216028.0
Epoch 657 - RMSE: 6419.970677411964, R-squared: 0.8436360437549516
Epoch 658 - Training Loss: 39627548.0, Testing Loss: 41109660.0
Epoch 658 - RMSE: 6411.681342865244, R-squared: 0.8440395709441755
Epoch 659 - Training Loss: 39617536.0, Testing Loss: 41328364.0
Epoch 659 - RMSE: 6428.7139611227185, R-squared: 0.8432098532183891
Epoch 660 - Training Loss: 39591904.0, Testing Loss: 41125372.0
Epoch 660 - RMSE: 6412.906637842281, R-squared: 0.8439799560694411
Epoch 661 - Training Loss: 39579484.0, Testing Loss: 41222512.0
Epoch 661 - RMSE: 6420.4759323543585, R-squared: 0.8436114309414392
Epoch 662 - Training Loss: 39564540.0, Testing Loss: 41239656.0
Epoch 662 - RMSE: 6421.811066356499, R-squared: 0.8435463823661683
Epoch 663 - Training Loss: 39538736.0, Testing Loss: 41032220.0
Epoch 663 - RMSE: 6405.639422003454, R-squared: 0.8443333648931961
Epoch 664 - Training Loss: 39521532.0, Testing Loss: 41080024.0
Epoch 664 - RMSE: 6409.369882247165, R-squared: 0.8441520005518248
Epoch 665 - Training Loss: 39506236.0, Testing Loss: 40902852.0
Epoch 665 - RMSE: 6395.533602353115, R-squared: 0.844824150561784
Epoch 666 - Training Loss: 39485760.0, Testing Loss: 41067684.0
Epoch 666 - RMSE: 6408.407078440372, R-squared: 0.8441988194372096
Epoch 667 - Training Loss: 39468836.0, Testing Loss: 41081972.0
Epoch 667 - RMSE: 6409.52233114912, R-squared: 0.8441445866751474
Epoch 668 - Training Loss: 39451148.0, Testing Loss: 41025756.0
Epoch 668 - RMSE: 6405.135063383407, R-squared: 0.8443578772683764
Epoch 669 - Training Loss: 39433492.0, Testing Loss: 40968600.0
Epoch 669 - RMSE: 6400.671889308531, R-squared: 0.8445747082508103
Epoch 670 - Training Loss: 39419652.0, Testing Loss: 41100436.0
Epoch 670 - RMSE: 6410.961952747766, R-squared: 0.844074566475353
Epoch 671 - Training Loss: 39400556.0, Testing Loss: 40893416.0
Epoch 671 - RMSE: 6394.796155982279, R-squared: 0.8448599340559041
Epoch 672 - Training Loss: 39389640.0, Testing Loss: 41141608.0
Epoch 672 - RMSE: 6414.172761741294, R-squared: 0.8439183427580056
Epoch 673 - Training Loss: 39363456.0, Testing Loss: 40918752.0
Epoch 673 - RMSE: 6396.776608272157, R-squared: 0.844763826199377
Epoch 674 - Training Loss: 39346896.0, Testing Loss: 40884416.0
Epoch 674 - RMSE: 6394.092469272362, R-squared: 0.8448940755651424
Epoch 675 - Training Loss: 39341352.0, Testing Loss: 40660728.0
Epoch 675 - RMSE: 6376.576565706756, R-squared: 0.8457427023920309
Epoch 676 - Training Loss: 39315952.0, Testing Loss: 41044456.0
Epoch 676 - RMSE: 6406.594857979474, R-squared: 0.8442869243786572
Epoch 677 - Training Loss: 39295876.0, Testing Loss: 40919456.0
Epoch 677 - RMSE: 6396.831742638645, R-squared: 0.8447611502000394
Epoch 678 - Training Loss: 39288284.0, Testing Loss: 41049516.0
Epoch 678 - RMSE: 6406.98954428687, R-squared: 0.84426773798923
Epoch 679 - Training Loss: 39260756.0, Testing Loss: 40926320.0
Epoch 679 - RMSE: 6397.367940083062, R-squared: 0.8447351241401033
Epoch 680 - Training Loss: 39245328.0, Testing Loss: 40832880.0
Epoch 680 - RMSE: 6390.061079636796, R-squared: 0.8450895983230444
Epoch 681 - Training Loss: 39234036.0, Testing Loss: 40656172.0
Epoch 681 - RMSE: 6376.219265921407, R-squared: 0.8457599889578209
Epoch 682 - Training Loss: 39211756.0, Testing Loss: 40905244.0
Epoch 682 - RMSE: 6395.721011083815, R-squared: 0.8448150561728331
Epoch 683 - Training Loss: 39197756.0, Testing Loss: 40670052.0
Epoch 683 - RMSE: 6377.307781328397, R-squared: 0.845707322337595
Epoch 684 - Training Loss: 39179100.0, Testing Loss: 40926372.0
Epoch 684 - RMSE: 6397.372428719791, R-squared: 0.8447349062605392
Epoch 685 - Training Loss: 39161144.0, Testing Loss: 40882192.0
Epoch 685 - RMSE: 6393.918274552399, R-squared: 0.8449025265736838
Epoch 686 - Training Loss: 39143284.0, Testing Loss: 40769316.0
Epoch 686 - RMSE: 6385.885477677888, R-squared: 0.8452227454447122

Epoch 686 - RMSE: 0.6385085477677029, R-squared: 0.8453307454447132
Epoch 687 - Training Loss: 39144544.0, Testing Loss: 41101340.0
Epoch 687 - RMSE: 6411.03252059536, R-squared: 0.8440711337977396
Epoch 688 - Training Loss: 39111452.0, Testing Loss: 40796640.0
Epoch 688 - RMSE: 6387.224975219981, R-squared: 0.8452270757500085
Epoch 689 - Training Loss: 39098740.0, Testing Loss: 40576104.0
Epoch 689 - RMSE: 6369.937304056438, R-squared: 0.8460637591149534
Epoch 690 - Training Loss: 39078012.0, Testing Loss: 40750928.0
Epoch 690 - RMSE: 6383.64563765664, R-squared: 0.845400493570731
Epoch 691 - Training Loss: 39067280.0, Testing Loss: 40808656.0
Epoch 691 - RMSE: 6388.165340929661, R-squared: 0.8451814991920555
Epoch 692 - Training Loss: 39046840.0, Testing Loss: 40778464.0
Epoch 692 - RMSE: 6385.801826742065, R-squared: 0.8452960385041405
Epoch 693 - Training Loss: 39035628.0, Testing Loss: 40924424.0
Epoch 693 - RMSE: 6397.219758194, R-squared: 0.8447423168407155
Epoch 694 - Training Loss: 39017388.0, Testing Loss: 40711604.0
Epoch 694 - RMSE: 6380.564750407671, R-squared: 0.8455496837788959
Epoch 695 - Training Loss: 38995420.0, Testing Loss: 40621468.0
Epoch 695 - RMSE: 6373.496893493959, R-squared: 0.8458916685931578
Epoch 696 - Training Loss: 38979196.0, Testing Loss: 40618480.0
Epoch 696 - RMSE: 6373.262794390273, R-squared: 0.8459029892104915
Epoch 697 - Training Loss: 38965216.0, Testing Loss: 40779336.0
Epoch 697 - RMSE: 6385.870053653499, R-squared: 0.8452927327235505
Epoch 698 - Training Loss: 38945128.0, Testing Loss: 40608392.0
Epoch 698 - RMSE: 6372.471097658987, R-squared: 0.8459412711788585
Epoch 699 - Training Loss: 38928980.0, Testing Loss: 40672168.0
Epoch 699 - RMSE: 6377.473687578575, R-squared: 0.8456992943566892
Epoch 700 - Training Loss: 38912700.0, Testing Loss: 40583656.0
Epoch 700 - RMSE: 6370.530288901372, R-squared: 0.8460350975748657
Epoch 701 - Training Loss: 38898472.0, Testing Loss: 40543472.0
Epoch 701 - RMSE: 6367.375693433734, R-squared: 0.8461875422556837
Epoch 702 - Training Loss: 38881744.0, Testing Loss: 40517704.0
Epoch 702 - RMSE: 6365.351857850588, R-squared: 0.8462853036157816
Epoch 703 - Training Loss: 38878676.0, Testing Loss: 40823316.0
Epoch 703 - RMSE: 6389.312319336662, R-squared: 0.8451258996859751
Epoch 704 - Training Loss: 38855424.0, Testing Loss: 40364232.0
Epoch 704 - RMSE: 6353.285298799521, R-squared: 0.8468675336190274
Epoch 705 - Training Loss: 38847956.0, Testing Loss: 40871820.0
Epoch 705 - RMSE: 6393.107533305642, R-squared: 0.8449418564310532
Epoch 706 - Training Loss: 38813844.0, Testing Loss: 40557708.0
Epoch 706 - RMSE: 6368.493446316939, R-squared: 0.8461335358905773
Epoch 707 - Training Loss: 38800712.0, Testing Loss: 40495096.0
Epoch 707 - RMSE: 6363.575965123816, R-squared: 0.8463710624983842
Epoch 708 - Training Loss: 38785320.0, Testing Loss: 40570272.0
Epoch 708 - RMSE: 6369.479829561341, R-squared: 0.8460858690265407
Epoch 709 - Training Loss: 38769148.0, Testing Loss: 40407056.0
Epoch 709 - RMSE: 6356.6543725288375, R-squared: 0.8467050818048606
Epoch 710 - Training Loss: 38749876.0, Testing Loss: 40406328.0
Epoch 710 - RMSE: 6356.597228784284, R-squared: 0.8467078379107489
Epoch 711 - Training Loss: 38733200.0, Testing Loss: 40479616.0
Epoch 711 - RMSE: 6362.359302979535, R-squared: 0.8464298020012386
Epoch 712 - Training Loss: 38715156.0, Testing Loss: 40445664.0
Epoch 712 - RMSE: 6359.691051835295, R-squared: 0.846558583767084
Epoch 713 - Training Loss: 38700320.0, Testing Loss: 40596672.0
Epoch 713 - RMSE: 6371.552061931509, R-squared: 0.8459857045749589
Epoch 714 - Training Loss: 38686620.0, Testing Loss: 40272216.0
Epoch 714 - RMSE: 6346.039326829314, R-squared: 0.8472166320010044
Epoch 715 - Training Loss: 38666264.0, Testing Loss: 40524860.0
Epoch 715 - RMSE: 6365.91385928053, R-squared: 0.8462581592584157
Epoch 716 - Training Loss: 38648584.0, Testing Loss: 40388992.0
Epoch 716 - RMSE: 6355.233445266034, R-squared: 0.8467736073437923
Epoch 717 - Training Loss: 38629200.0, Testing Loss: 40412356.0
Epoch 717 - RMSE: 6357.071437009103, R-squared: 0.8466849655742116
Epoch 718 - Training Loss: 38614112.0, Testing Loss: 40409064.0
Epoch 718 - RMSE: 6356.812464519268, R-squared: 0.8466974567245329
Epoch 719 - Training Loss: 38596836.0, Testing Loss: 40340768.0
Epoch 719 - RMSE: 6351.43821931051, R-squared: 0.8469565605424302
Epoch 720 - Training Loss: 38580716.0, Testing Loss: 40319488.0
Epoch 720 - RMSE: 6349.762854468383, R-squared: 0.847037288645961
Epoch 721 - Training Loss: 38588080.0, Testing Loss: 40621124.0
Epoch 721 - RMSE: 6373.470143694776, R-squared: 0.8458929621870311
Epoch 722 - Training Loss: 38551624.0, Testing Loss: 40192376.0
Epoch 722 - RMSE: 6328.745744152762, R-squared: 0.8475125500644124

Epoch 722 - RMSE: 6339.1745744153763, R-squared: 0.8475195226404104
Epoch 723 - Training Loss: 38533316.0, Testing Loss: 40241484.0
Epoch 723 - RMSE: 6343.61756069279, R-squared: 0.84733321967634
Epoch 724 - Training Loss: 38535060.0, Testing Loss: 40635724.0
Epoch 724 - RMSE: 6374.615458427412, R-squared: 0.8458375710373183
Epoch 725 - Training Loss: 38501688.0, Testing Loss: 40146364.0
Epoch 725 - RMSE: 6336.115756047794, R-squared: 0.8476940860631046
Epoch 726 - Training Loss: 38482416.0, Testing Loss: 40197712.0
Epoch 726 - RMSE: 6340.16650528047, R-squared: 0.847499282085321
Epoch 727 - Training Loss: 38465088.0, Testing Loss: 40310536.0
Epoch 727 - RMSE: 6349.05798603247, R-squared: 0.8470712466394371
Epoch 728 - Training Loss: 38451672.0, Testing Loss: 40144852.0
Epoch 728 - RMSE: 6335.996419376994, R-squared: 0.8476998231772132
Epoch 729 - Training Loss: 38440588.0, Testing Loss: 40361496.0
Epoch 729 - RMSE: 6353.069201748319, R-squared: 0.8468779505639921
Epoch 730 - Training Loss: 38416620.0, Testing Loss: 40164728.0
Epoch 730 - RMSE: 6337.564976603915, R-squared: 0.8476244061164901
Epoch 731 - Training Loss: 38399640.0, Testing Loss: 40197108.0
Epoch 731 - RMSE: 6340.119080172262, R-squared: 0.8475015635194105
Epoch 732 - Training Loss: 38382984.0, Testing Loss: 40173908.0
Epoch 732 - RMSE: 6338.288692059414, R-squared: 0.8475896032011011
Epoch 733 - Training Loss: 38367876.0, Testing Loss: 40074176.0
Epoch 733 - RMSE: 6330.416456137321, R-squared: 0.8479679594321762
Epoch 734 - Training Loss: 38350272.0, Testing Loss: 40194360.0
Epoch 734 - RMSE: 6339.902099285783, R-squared: 0.8475120013926749
Epoch 735 - Training Loss: 38335504.0, Testing Loss: 40215336.0
Epoch 735 - RMSE: 6341.55638316941, R-squared: 0.847432412987128
Epoch 736 - Training Loss: 38319196.0, Testing Loss: 40089500.0
Epoch 736 - RMSE: 6331.626708314235, R-squared: 0.8479098227526505
Epoch 737 - Training Loss: 38302144.0, Testing Loss: 40060996.0
Epoch 737 - RMSE: 6329.376178687272, R-squared: 0.8480179221825687
Epoch 738 - Training Loss: 38291932.0, Testing Loss: 40151680.0
Epoch 738 - RMSE: 6336.53531230769, R-squared: 0.847673915025288
Epoch 739 - Training Loss: 38271088.0, Testing Loss: 40012792.0
Epoch 739 - RMSE: 6325.566913354899, R-squared: 0.8482008046118898
Epoch 740 - Training Loss: 38253448.0, Testing Loss: 40028236.0
Epoch 740 - RMSE: 6326.787137937226, R-squared: 0.8481422337429043
Epoch 741 - Training Loss: 38239792.0, Testing Loss: 40137472.0
Epoch 741 - RMSE: 6335.4141353400255, R-squared: 0.8477278149502332
Epoch 742 - Training Loss: 38223656.0, Testing Loss: 40139060.0
Epoch 742 - RMSE: 6335.539224095973, R-squared: 0.8477218018543795
Epoch 743 - Training Loss: 38234308.0, Testing Loss: 40412940.0
Epoch 743 - RMSE: 6357.11726119631, R-squared: 0.8466827552601605
Epoch 744 - Training Loss: 38188220.0, Testing Loss: 40038108.0
Epoch 744 - RMSE: 6327.566900493264, R-squared: 0.8481047991668835
Epoch 745 - Training Loss: 38174048.0, Testing Loss: 39934288.0
Epoch 745 - RMSE: 6319.358160017576, R-squared: 0.8484986502388087
Epoch 746 - Training Loss: 38156212.0, Testing Loss: 39996612.0
Epoch 746 - RMSE: 6324.287191564189, R-squared: 0.8482622192140661
Epoch 747 - Training Loss: 38141552.0, Testing Loss: 40079444.0
Epoch 747 - RMSE: 6330.832654046082, R-squared: 0.8479479678572672
Epoch 748 - Training Loss: 38134156.0, Testing Loss: 40156576.0
Epoch 748 - RMSE: 6336.921794874294, R-squared: 0.847655332892074
Epoch 749 - Training Loss: 38109064.0, Testing Loss: 39973848.0
Epoch 749 - RMSE: 6322.48719648411, R-squared: 0.8483485810070628
Epoch 750 - Training Loss: 38092716.0, Testing Loss: 39903848.0
Epoch 750 - RMSE: 6316.949523978304, R-squared: 0.8486141183159134
Epoch 751 - Training Loss: 38080896.0, Testing Loss: 39942812.0
Epoch 751 - RMSE: 6320.032524909984, R-squared: 0.8484663138400206
Epoch 752 - Training Loss: 38072120.0, Testing Loss: 40134228.0
Epoch 752 - RMSE: 6335.158050784073, R-squared: 0.8477401247269762
Epoch 753 - Training Loss: 38046788.0, Testing Loss: 39782564.0
Epoch 753 - RMSE: 6307.3422783016285, R-squared: 0.84907424440065313
Epoch 754 - Training Loss: 38028408.0, Testing Loss: 39943712.0
Epoch 754 - RMSE: 6320.1037891090855, R-squared: 0.8484628964564478
Epoch 755 - Training Loss: 38013768.0, Testing Loss: 39954432.0
Epoch 755 - RMSE: 6320.95185143453, R-squared: 0.8484222257538913
Epoch 756 - Training Loss: 38002680.0, Testing Loss: 39900936.0
Epoch 756 - RMSE: 6316.718793027582, R-squared: 0.8486251770620262
Epoch 757 - Training Loss: 37996464.0, Testing Loss: 40068984.0
Epoch 757 - RMSE: 6330.006688456442, R-squared: 0.8479876408546692
Epoch 758 - Training Loss: 37994500.0, Testing Loss: 39545156.0
Epoch 758 - RMSE: 6330.40222545241, R-squared: 0.8480740065007100

Epoch 758 - RMSE: 6288.493892545341, R-squared: 0.8499749265097188
Epoch 759 - Training Loss: 37952996.0, Testing Loss: 39869704.0
Epoch 759 - RMSE: 6314.245909225892, R-squared: 0.8487436749998447
Epoch 760 - Training Loss: 37941688.0, Testing Loss: 39958536.0
Epoch 760 - RMSE: 6321.276199313757, R-squared: 0.8484066694920661
Epoch 761 - Training Loss: 37921032.0, Testing Loss: 39790004.0
Epoch 761 - RMSE: 6307.931712911869, R-squared: 0.8490460340198125
Epoch 762 - Training Loss: 37905896.0, Testing Loss: 39773516.0
Epoch 762 - RMSE: 6306.624751111602, R-squared: 0.8491085808695281
Epoch 763 - Training Loss: 37898560.0, Testing Loss: 39876224.0
Epoch 763 - RMSE: 6314.762383965802, R-squared: 0.8487189299179588
Epoch 764 - Training Loss: 37877396.0, Testing Loss: 39790284.0
Epoch 764 - RMSE: 6307.954072048085, R-squared: 0.8490449638730757
Epoch 765 - Training Loss: 37862908.0, Testing Loss: 39873212.0
Epoch 765 - RMSE: 6314.524180502593, R-squared: 0.8487303428557567
Epoch 766 - Training Loss: 37846732.0, Testing Loss: 39730800.0
Epoch 766 - RMSE: 6303.237352179554, R-squared: 0.8492706302014246
Epoch 767 - Training Loss: 37834160.0, Testing Loss: 39863716.0
Epoch 767 - RMSE: 6313.772082943357, R-squared: 0.8487663749498169
Epoch 768 - Training Loss: 37820624.0, Testing Loss: 39841936.0
Epoch 768 - RMSE: 6312.0468357279715, R-squared: 0.8488490132646982
Epoch 769 - Training Loss: 37804112.0, Testing Loss: 39646580.0
Epoch 769 - RMSE: 6296.553233448353, R-squared: 0.8495901354847278
Epoch 770 - Training Loss: 37785620.0, Testing Loss: 39720188.0
Epoch 770 - RMSE: 6302.395374014285, R-squared: 0.8493108959743452
Epoch 771 - Training Loss: 37772800.0, Testing Loss: 39720024.0
Epoch 771 - RMSE: 6302.382549525433, R-squared: 0.8493115092360191
Epoch 772 - Training Loss: 37762384.0, Testing Loss: 39569920.0
Epoch 772 - RMSE: 6290.462542436775, R-squared: 0.8498809793485329
Epoch 773 - Training Loss: 37742352.0, Testing Loss: 39748028.0
Epoch 773 - RMSE: 6304.603591304512, R-squared: 0.849205281343714
Epoch 774 - Training Loss: 37732896.0, Testing Loss: 39770440.0
Epoch 774 - RMSE: 6306.380853772385, R-squared: 0.849120251550903
Epoch 775 - Training Loss: 37717364.0, Testing Loss: 39539104.0
Epoch 775 - RMSE: 6288.012586347615, R-squared: 0.8499978907474539
Epoch 776 - Training Loss: 37699964.0, Testing Loss: 39531524.0
Epoch 776 - RMSE: 6287.409790483364, R-squared: 0.8500266490604467
Epoch 777 - Training Loss: 37686480.0, Testing Loss: 39731732.0
Epoch 777 - RMSE: 6303.311115628457, R-squared: 0.8492671023687881
Epoch 778 - Training Loss: 37669724.0, Testing Loss: 39561288.0
Epoch 778 - RMSE: 6289.77652311162, R-squared: 0.8499137206399561
Epoch 779 - Training Loss: 37655124.0, Testing Loss: 39696740.0
Epoch 779 - RMSE: 6300.535248885595, R-squared: 0.8493998333410522
Epoch 780 - Training Loss: 37643916.0, Testing Loss: 39749496.0
Epoch 780 - RMSE: 6304.72018125107, R-squared: 0.8491997040507098
Epoch 781 - Training Loss: 37624384.0, Testing Loss: 39571600.0
Epoch 781 - RMSE: 6290.595791034229, R-squared: 0.8498746194471178
Epoch 782 - Training Loss: 37609364.0, Testing Loss: 39529156.0
Epoch 782 - RMSE: 6287.221811897239, R-squared: 0.8500356166187806
Epoch 783 - Training Loss: 37596140.0, Testing Loss: 39629088.0
Epoch 783 - RMSE: 6295.163671590187, R-squared: 0.8496565148961154
Epoch 784 - Training Loss: 37581608.0, Testing Loss: 39570272.0
Epoch 784 - RMSE: 6290.490490453696, R-squared: 0.8498796454122058
Epoch 785 - Training Loss: 37568884.0, Testing Loss: 39436444.0
Epoch 785 - RMSE: 6279.844117141885, R-squared: 0.8503873593548704
Epoch 786 - Training Loss: 37555280.0, Testing Loss: 39650892.0
Epoch 786 - RMSE: 6296.895496231642, R-squared: 0.8495737833326537
Epoch 787 - Training Loss: 37535600.0, Testing Loss: 39542436.0
Epoch 787 - RMSE: 6288.277738266771, R-squared: 0.849985239950345
Epoch 788 - Training Loss: 37523332.0, Testing Loss: 39509336.0
Epoch 788 - RMSE: 6285.645247680002, R-squared: 0.8501108163953228
Epoch 789 - Training Loss: 37508188.0, Testing Loss: 39453288.0
Epoch 789 - RMSE: 6281.1852628812985, R-squared: 0.8503234489208424
Epoch 790 - Training Loss: 37510160.0, Testing Loss: 39689912.0
Epoch 790 - RMSE: 6299.993061316238, R-squared: 0.849425751781872
Epoch 791 - Training Loss: 37480420.0, Testing Loss: 39454260.0
Epoch 791 - RMSE: 6281.262484207777, R-squared: 0.8503197686304571
Epoch 792 - Training Loss: 37473260.0, Testing Loss: 39372548.0
Epoch 792 - RMSE: 6274.754832588294, R-squared: 0.8506297579727196
Epoch 793 - Training Loss: 37451032.0, Testing Loss: 39446620.0
Epoch 793 - RMSE: 6280.654194860399, R-squared: 0.8503487578605078
Epoch 794 - Training Loss: 37438240.0, Testing Loss: 39549200.0
Epoch 794 - RMSE: 6288.01510047116, R-squared: 0.8499978907474539

Epoch 794 - RMSE: 6288.81512347116, R-squared: 0.849959598857351
Epoch 795 - Training Loss: 37421592.0, Testing Loss: 39425748.0
Epoch 795 - RMSE: 6278.992393752329, R-squared: 0.8504279399621546
Epoch 796 - Training Loss: 37410032.0, Testing Loss: 39308248.0
Epoch 796 - RMSE: 6269.628956997768, R-squared: 0.8508737007450401
Epoch 797 - Training Loss: 37395092.0, Testing Loss: 39335484.0
Epoch 797 - RMSE: 6271.80053565497, R-squared: 0.8507703786587706
Epoch 798 - Training Loss: 37379164.0, Testing Loss: 39399092.0
Epoch 798 - RMSE: 6276.869585529551, R-squared: 0.8505290578188142
Epoch 799 - Training Loss: 37365708.0, Testing Loss: 39441548.0
Epoch 799 - RMSE: 6280.250571142142, R-squared: 0.8503679917963494
Epoch 800 - Training Loss: 37349028.0, Testing Loss: 39406068.0
Epoch 800 - RMSE: 6277.425224746545, R-squared: 0.8505025938013309
Epoch 801 - Training Loss: 37360252.0, Testing Loss: 39655156.0
Epoch 801 - RMSE: 6297.234267950501, R-squared: 0.8495575970964885
Epoch 802 - Training Loss: 37323544.0, Testing Loss: 39280540.0
Epoch 802 - RMSE: 6267.418702504924, R-squared: 0.850978826256108
Epoch 803 - Training Loss: 37308100.0, Testing Loss: 39280396.0
Epoch 803 - RMSE: 6267.407538815694, R-squared: 0.8509793571364176
Epoch 804 - Training Loss: 37292052.0, Testing Loss: 39251504.0
Epoch 804 - RMSE: 6265.1019078838035, R-squared: 0.8510889793056664
Epoch 805 - Training Loss: 37280532.0, Testing Loss: 39240472.0
Epoch 805 - RMSE: 6264.221575007137, R-squared: 0.8511308244533051
Epoch 806 - Training Loss: 37265536.0, Testing Loss: 39370996.0
Epoch 806 - RMSE: 6274.631129564697, R-squared: 0.8506356474039181
Epoch 807 - Training Loss: 37254080.0, Testing Loss: 39410004.0
Epoch 807 - RMSE: 6277.738763693277, R-squared: 0.850487659515954
Epoch 808 - Training Loss: 37235208.0, Testing Loss: 39243360.0
Epoch 808 - RMSE: 6264.452014995904, R-squared: 0.8511198714428724
Epoch 809 - Training Loss: 37222756.0, Testing Loss: 39284216.0
Epoch 809 - RMSE: 6267.712282711393, R-squared: 0.8509648649448569
Epoch 810 - Training Loss: 37211024.0, Testing Loss: 39391816.0
Epoch 810 - RMSE: 6276.289940657102, R-squared: 0.850556662682543
Epoch 811 - Training Loss: 37193496.0, Testing Loss: 39320080.0
Epoch 811 - RMSE: 6270.572384289617, R-squared: 0.8508288175767315
Epoch 812 - Training Loss: 37178580.0, Testing Loss: 39223860.0
Epoch 812 - RMSE: 6262.895434809025, R-squared: 0.851193849203775
Epoch 813 - Training Loss: 37164056.0, Testing Loss: 39162568.0
Epoch 813 - RMSE: 6258.000277935317, R-squared: 0.8514263757674851
Epoch 814 - Training Loss: 37147524.0, Testing Loss: 39256984.0
Epoch 814 - RMSE: 6265.539182694862, R-squared: 0.851068191994699
Epoch 815 - Training Loss: 37139544.0, Testing Loss: 39091796.0
Epoch 815 - RMSE: 6252.34332289881, R-squared: 0.8516948623123268
Epoch 816 - Training Loss: 37120644.0, Testing Loss: 39290468.0
Epoch 816 - RMSE: 6268.21125592836, R-squared: 0.8509411345955654
Epoch 817 - Training Loss: 37105600.0, Testing Loss: 39234324.0
Epoch 817 - RMSE: 6263.730904755799, R-squared: 0.8511541450891127
Epoch 818 - Training Loss: 37090428.0, Testing Loss: 39174204.0
Epoch 818 - RMSE: 6258.92983717372, R-squared: 0.8513822344328451
Epoch 819 - Training Loss: 37081456.0, Testing Loss: 39322600.0
Epoch 819 - RMSE: 6270.773609008358, R-squared: 0.8508192435190493
Epoch 820 - Training Loss: 37066984.0, Testing Loss: 39060444.0
Epoch 820 - RMSE: 6249.835565071465, R-squared: 0.8518138061275141
Epoch 821 - Training Loss: 37053224.0, Testing Loss: 39243204.0
Epoch 821 - RMSE: 6264.439704527332, R-squared: 0.851120456580196
Epoch 822 - Training Loss: 37042828.0, Testing Loss: 39001924.0
Epoch 822 - RMSE: 6245.151992203544, R-squared: 0.8520358218191878
Epoch 823 - Training Loss: 37034524.0, Testing Loss: 39341964.0
Epoch 823 - RMSE: 6272.3169716424945, R-squared: 0.8507458017547712
Epoch 824 - Training Loss: 37007872.0, Testing Loss: 39116612.0
Epoch 824 - RMSE: 6254.327211912009, R-squared: 0.8516007319689676
Epoch 825 - Training Loss: 37001224.0, Testing Loss: 39288976.0
Epoch 825 - RMSE: 6268.091755390623, R-squared: 0.8509468180175332
Epoch 826 - Training Loss: 36985772.0, Testing Loss: 39064880.0
Epoch 826 - RMSE: 6250.190327333938, R-squared: 0.8517969825292258
Epoch 827 - Training Loss: 36966604.0, Testing Loss: 39039428.0
Epoch 827 - RMSE: 6248.153848616773, R-squared: 0.8518935437876347
Epoch 828 - Training Loss: 36953792.0, Testing Loss: 39063120.0
Epoch 828 - RMSE: 6250.049481275211, R-squared: 0.8518036618700511
Epoch 829 - Training Loss: 36939440.0, Testing Loss: 39056772.0
Epoch 829 - RMSE: 6249.541433353554, R-squared: 0.8518277537693955
Epoch 830 - Training Loss: 36923496.0, Testing Loss: 39067192.0
Epoch 830 - RMSE: 6250.375536666667, R-squared: 0.8517881881386142

Epoch 830 - RMSE: 6250.375536260031, R-squared: 0.8517881991396148
Epoch 831 - Training Loss: 36926408.0, Testing Loss: 39217488.0
Epoch 831 - RMSE: 6262.3867011304865, R-squared: 0.8512180232065552
Epoch 832 - Training Loss: 36899360.0, Testing Loss: 39025212.0
Epoch 832 - RMSE: 6247.016098122488, R-squared: 0.8519474774312967
Epoch 833 - Training Loss: 36902828.0, Testing Loss: 38811740.0
Epoch 833 - RMSE: 6229.9066641829895, R-squared: 0.8527573444055759
Epoch 834 - Training Loss: 36872712.0, Testing Loss: 38974340.0
Epoch 834 - RMSE: 6242.942887080837, R-squared: 0.8521404823983456
Epoch 835 - Training Loss: 36860976.0, Testing Loss: 39157964.0
Epoch 835 - RMSE: 6257.632336571372, R-squared: 0.851443846132603
Epoch 836 - Training Loss: 36842208.0, Testing Loss: 39097596.0
Epoch 836 - RMSE: 6252.807172120124, R-squared: 0.8516728565551814
Epoch 837 - Training Loss: 36828276.0, Testing Loss: 39057608.0
Epoch 837 - RMSE: 6249.608612826981, R-squared: 0.8518245681958344
Epoch 838 - Training Loss: 36819324.0, Testing Loss: 39001352.0
Epoch 838 - RMSE: 6245.105975734866, R-squared: 0.852038002315001
Epoch 839 - Training Loss: 36803060.0, Testing Loss: 38975212.0
Epoch 839 - RMSE: 6243.013471927971, R-squared: 0.8521371388789073
Epoch 840 - Training Loss: 36787868.0, Testing Loss: 39030656.0
Epoch 840 - RMSE: 6247.452101359645, R-squared: 0.8519268104021938
Epoch 841 - Training Loss: 36774700.0, Testing Loss: 38987840.0
Epoch 841 - RMSE: 6244.0243061126475, R-squared: 0.8520892527304642
Epoch 842 - Training Loss: 36763996.0, Testing Loss: 38891800.0
Epoch 842 - RMSE: 6236.328556206525, R-squared: 0.8524536275621342
Epoch 843 - Training Loss: 36746996.0, Testing Loss: 38917984.0
Epoch 843 - RMSE: 6238.428054984969, R-squared: 0.8523542660325163
Epoch 844 - Training Loss: 36734392.0, Testing Loss: 38950776.0
Epoch 844 - RMSE: 6241.055341747952, R-squared: 0.8522298791318873
Epoch 845 - Training Loss: 36720772.0, Testing Loss: 39004112.0
Epoch 845 - RMSE: 6245.327012511092, R-squared: 0.85202752831444
Epoch 846 - Training Loss: 36709952.0, Testing Loss: 38858868.0
Epoch 846 - RMSE: 6233.688017430016, R-squared: 0.8525785470345787
Epoch 847 - Training Loss: 36695848.0, Testing Loss: 38936724.0
Epoch 847 - RMSE: 6239.929687362477, R-squared: 0.8522831787983336
Epoch 848 - Training Loss: 36680680.0, Testing Loss: 38865236.0
Epoch 848 - RMSE: 6234.198841022941, R-squared: 0.8525543849521705
Epoch 849 - Training Loss: 36668140.0, Testing Loss: 39031996.0
Epoch 849 - RMSE: 6247.559082808896, R-squared: 0.8519217391444096
Epoch 850 - Training Loss: 36653636.0, Testing Loss: 38928008.0
Epoch 850 - RMSE: 6239.231258474951, R-squared: 0.8523162445302989
Epoch 851 - Training Loss: 36638732.0, Testing Loss: 38817948.0
Epoch 851 - RMSE: 6230.405160569808, R-squared: 0.852733779728811
Epoch 852 - Training Loss: 36626528.0, Testing Loss: 38922572.0
Epoch 852 - RMSE: 6238.795473138657, R-squared: 0.8523368740485158
Epoch 853 - Training Loss: 36611448.0, Testing Loss: 38898792.0
Epoch 853 - RMSE: 6236.88964490241, R-squared: 0.8524270765794064
Epoch 854 - Training Loss: 36608376.0, Testing Loss: 39041392.0
Epoch 854 - RMSE: 6248.311255473313, R-squared: 0.8518860813384291
Epoch 855 - Training Loss: 36587472.0, Testing Loss: 38935584.0
Epoch 855 - RMSE: 6239.838862167829, R-squared: 0.8522874789465946
Epoch 856 - Training Loss: 36572848.0, Testing Loss: 38835388.0
Epoch 856 - RMSE: 6231.80450192532, R-squared: 0.8526676206752151
Epoch 857 - Training Loss: 36561748.0, Testing Loss: 38968668.0
Epoch 857 - RMSE: 6242.488678648009, R-squared: 0.8521619968020133
Epoch 858 - Training Loss: 36545296.0, Testing Loss: 38836720.0
Epoch 858 - RMSE: 6231.9116559724625, R-squared: 0.8526625539577198
Epoch 859 - Training Loss: 36540436.0, Testing Loss: 38887920.0
Epoch 859 - RMSE: 6236.017977520295, R-squared: 0.8524683232655518
Epoch 860 - Training Loss: 36531276.0, Testing Loss: 38644688.0
Epoch 860 - RMSE: 6216.485354126802, R-squared: 0.8533910812344137
Epoch 861 - Training Loss: 36518928.0, Testing Loss: 38958408.0
Epoch 861 - RMSE: 6241.667204649364, R-squared: 0.8522009034276138
Epoch 862 - Training Loss: 36492396.0, Testing Loss: 38805492.0
Epoch 862 - RMSE: 6229.405601321459, R-squared: 0.8527810285033974
Epoch 863 - Training Loss: 36484848.0, Testing Loss: 38791532.0
Epoch 863 - RMSE: 6228.284939351429, R-squared: 0.8528339927420726
Epoch 864 - Training Loss: 36471768.0, Testing Loss: 38854464.0
Epoch 864 - RMSE: 6233.334948057177, R-squared: 0.8525952461461698
Epoch 865 - Training Loss: 36455916.0, Testing Loss: 38846156.0
Epoch 865 - RMSE: 6232.668337993518, R-squared: 0.8526267722037267
Epoch 866 - Training Loss: 36441468.0, Testing Loss: 38728424.0

Epoch 866 - RMSE: 6223.21676/16618, R-squared: 0.8530734034962871
Epoch 867 - Training Loss: 36425564.0, Testing Loss: 38808620.0
Epoch 867 - RMSE: 6229.656502535173, R-squared: 0.8527691692138097
Epoch 868 - Training Loss: 36417448.0, Testing Loss: 38829716.0
Epoch 868 - RMSE: 6231.349328410945, R-squared: 0.8526891423220342
Epoch 869 - Training Loss: 36401340.0, Testing Loss: 38790868.0
Epoch 869 - RMSE: 6228.231204557829, R-squared: 0.8528365320931103
Epoch 870 - Training Loss: 36390904.0, Testing Loss: 38625316.0
Epoch 870 - RMSE: 6214.926707450401, R-squared: 0.8534645899274572
Epoch 871 - Training Loss: 36377676.0, Testing Loss: 38584984.0
Epoch 871 - RMSE: 6211.680925434541, R-squared: 0.8536176079187836
Epoch 872 - Training Loss: 36362012.0, Testing Loss: 38626844.0
Epoch 872 - RMSE: 6215.049690176107, R-squared: 0.8534587905018817
Epoch 873 - Training Loss: 36346484.0, Testing Loss: 38705396.0
Epoch 873 - RMSE: 6221.366133185271, R-squared: 0.8531607753276178
Epoch 874 - Training Loss: 36337452.0, Testing Loss: 38630456.0
Epoch 874 - RMSE: 6215.340317990744, R-squared: 0.853445085077351
Epoch 875 - Training Loss: 36322184.0, Testing Loss: 38661972.0
Epoch 875 - RMSE: 6217.874899061071, R-squared: 0.853325532154158
Epoch 876 - Training Loss: 36311892.0, Testing Loss: 38787684.0
Epoch 876 - RMSE: 6227.976317937067, R-squared: 0.8528485769996866
Epoch 877 - Training Loss: 36296640.0, Testing Loss: 38595936.0
Epoch 877 - RMSE: 6212.562499854826, R-squared: 0.8535760551953606
Epoch 878 - Training Loss: 36281236.0, Testing Loss: 38679952.0
Epoch 878 - RMSE: 6219.320831592893, R-squared: 0.8532573075445389
Epoch 879 - Training Loss: 36270764.0, Testing Loss: 38764160.0
Epoch 879 - RMSE: 6226.087163862341, R-squared: 0.8529378353828497
Epoch 880 - Training Loss: 36256876.0, Testing Loss: 38534492.0
Epoch 880 - RMSE: 6207.615771711007, R-squared: 0.8538091413270407
Epoch 881 - Training Loss: 36238708.0, Testing Loss: 38663292.0
Epoch 881 - RMSE: 6217.981439512619, R-squared: 0.8533205057108257
Epoch 882 - Training Loss: 36234708.0, Testing Loss: 38635056.0
Epoch 882 - RMSE: 6215.710579722675, R-squared: 0.8534276233487407
Epoch 883 - Training Loss: 36218004.0, Testing Loss: 38486176.0
Epoch 883 - RMSE: 6203.722483755418, R-squared: 0.8539924595756438
Epoch 884 - Training Loss: 36203576.0, Testing Loss: 38521216.0
Epoch 884 - RMSE: 6206.546172459075, R-squared: 0.8538595156309879
Epoch 885 - Training Loss: 36191768.0, Testing Loss: 38564192.0
Epoch 885 - RMSE: 6210.007476510801, R-squared: 0.8536964691682296
Epoch 886 - Training Loss: 36176068.0, Testing Loss: 38598980.0
Epoch 886 - RMSE: 6212.807724909982, R-squared: 0.853564495543894
Epoch 887 - Training Loss: 36168136.0, Testing Loss: 38684964.0
Epoch 887 - RMSE: 6219.723566551109, R-squared: 0.8532383021491952
Epoch 888 - Training Loss: 36148532.0, Testing Loss: 38577096.0
Epoch 888 - RMSE: 6211.046249410617, R-squared: 0.853647519515792
Epoch 889 - Training Loss: 36141404.0, Testing Loss: 38653856.0
Epoch 889 - RMSE: 6217.222173994235, R-squared: 0.8533563250145163
Epoch 890 - Training Loss: 36132076.0, Testing Loss: 38361220.0
Epoch 890 - RMSE: 6193.6433552052595, R-squared: 0.8544665082786576
Epoch 891 - Training Loss: 36114320.0, Testing Loss: 38370872.0
Epoch 891 - RMSE: 6194.4225849363675, R-squared: 0.8544298864872932
Epoch 892 - Training Loss: 36095752.0, Testing Loss: 38445176.0
Epoch 892 - RMSE: 6200.417522631001, R-squared: 0.8541479857810741
Epoch 893 - Training Loss: 36083820.0, Testing Loss: 38533032.0
Epoch 893 - RMSE: 6207.497915314697, R-squared: 0.8538146923678436
Epoch 894 - Training Loss: 36070764.0, Testing Loss: 38414396.0
Epoch 894 - RMSE: 6197.93478057855, R-squared: 0.8542647651527973
Epoch 895 - Training Loss: 36067260.0, Testing Loss: 38276020.0
Epoch 895 - RMSE: 6186.761665002332, R-squared: 0.8547897299947766
Epoch 896 - Training Loss: 36046136.0, Testing Loss: 38543784.0
Epoch 896 - RMSE: 6208.364173708254, R-squared: 0.8537738891046271
Epoch 897 - Training Loss: 36031116.0, Testing Loss: 38392340.0
Epoch 897 - RMSE: 6196.15526183115, R-squared: 0.8543484386220337
Epoch 898 - Training Loss: 36016828.0, Testing Loss: 38502688.0
Epoch 898 - RMSE: 6205.052936103625, R-squared: 0.8539298272107587
Epoch 899 - Training Loss: 36006508.0, Testing Loss: 38418152.0
Epoch 899 - RMSE: 6198.2376736881615, R-squared: 0.8542505206411526
Epoch 900 - Training Loss: 35986952.0, Testing Loss: 38442660.0
Epoch 900 - RMSE: 6200.214877242836, R-squared: 0.8541575192535997
Epoch 901 - Training Loss: 35974092.0, Testing Loss: 38354412.0
Epoch 901 - RMSE: 6193.0937915477225, R-squared: 0.8544923335853786
Epoch 902 - Training Loss: 35962728.0, Testing Loss: 38457248.0
Epoch 902 - RMSE: 6201.200051043152, R-squared: 0.8541001010000001

Epoch 902 - RMSE: 6201.390851243153, R-squared: 0.854102191096924
Epoch 903 - Training Loss: 35956596.0, Testing Loss: 38204020.0
Epoch 903 - RMSE: 6180.939931486528, R-squared: 0.8550628867100148
Epoch 904 - Training Loss: 35940616.0, Testing Loss: 38535104.0
Epoch 904 - RMSE: 6207.664981043703, R-squared: 0.8538068235343872
Epoch 905 - Training Loss: 35922084.0, Testing Loss: 38249296.0
Epoch 905 - RMSE: 6184.601417515902, R-squared: 0.8548911191776066
Epoch 906 - Training Loss: 35906792.0, Testing Loss: 38354108.0
Epoch 906 - RMSE: 6193.069384792079, R-squared: 0.8544934804638791
Epoch 907 - Training Loss: 35892852.0, Testing Loss: 38295696.0
Epoch 907 - RMSE: 6188.35154146551, R-squared: 0.8547150880198424
Epoch 908 - Training Loss: 35879296.0, Testing Loss: 38265068.0
Epoch 908 - RMSE: 6185.876328991508, R-squared: 0.8548312866893998
Epoch 909 - Training Loss: 35870360.0, Testing Loss: 38271648.0
Epoch 909 - RMSE: 6186.408041575768, R-squared: 0.8548063294012206
Epoch 910 - Training Loss: 35851936.0, Testing Loss: 38273844.0
Epoch 910 - RMSE: 6186.58608930045, R-squared: 0.8547979717970916
Epoch 911 - Training Loss: 35838096.0, Testing Loss: 38290512.0
Epoch 911 - RMSE: 6187.932977998637, R-squared: 0.8547347407171693
Epoch 912 - Training Loss: 35825132.0, Testing Loss: 38266244.0
Epoch 912 - RMSE: 6185.9716525802105, R-squared: 0.8548268125911136
Epoch 913 - Training Loss: 35810216.0, Testing Loss: 38230580.0
Epoch 913 - RMSE: 6183.0881998172745, R-squared: 0.8549621195376396
Epoch 914 - Training Loss: 35802412.0, Testing Loss: 38133492.0
Epoch 914 - RMSE: 6175.232083937592, R-squared: 0.8553304502122383
Epoch 915 - Training Loss: 35787972.0, Testing Loss: 38345904.0
Epoch 915 - RMSE: 6192.406820489888, R-squared: 0.8545246127708261
Epoch 916 - Training Loss: 35776272.0, Testing Loss: 38147564.0
Epoch 916 - RMSE: 6176.371665167598, R-squared: 0.8552770504652543
Epoch 917 - Training Loss: 35768416.0, Testing Loss: 38099244.0
Epoch 917 - RMSE: 6172.45860544474, R-squared: 0.8554603717360231
Epoch 918 - Training Loss: 35750724.0, Testing Loss: 38075344.0
Epoch 918 - RMSE: 6170.521988642498, R-squared: 0.8555510564949758
Epoch 919 - Training Loss: 35731132.0, Testing Loss: 38152552.0
Epoch 919 - RMSE: 6176.7755412308625, R-squared: 0.855258122832873
Epoch 920 - Training Loss: 35720164.0, Testing Loss: 38210488.0
Epoch 920 - RMSE: 6181.463557940236, R-squared: 0.8550383285935577
Epoch 921 - Training Loss: 35705412.0, Testing Loss: 38105356.0
Epoch 921 - RMSE: 6172.953603846829, R-squared: 0.8554371881852072
Epoch 922 - Training Loss: 35697720.0, Testing Loss: 38255352.0
Epoch 922 - RMSE: 6185.091131769907, R-squared: 0.8548681380035698
Epoch 923 - Training Loss: 35679148.0, Testing Loss: 38127852.0
Epoch 923 - RMSE: 6174.775467684702, R-squared: 0.8553518440722738
Epoch 924 - Training Loss: 35667728.0, Testing Loss: 38063560.0
Epoch 924 - RMSE: 6169.567240279948, R-squared: 0.8555957534341098
Epoch 925 - Training Loss: 35651876.0, Testing Loss: 38106228.0
Epoch 925 - RMSE: 6173.0242484291975, R-squared: 0.8554338793516861
Epoch 926 - Training Loss: 35641976.0, Testing Loss: 38152832.0
Epoch 926 - RMSE: 6176.79811724328, R-squared: 0.8552570647726063
Epoch 927 - Training Loss: 35634252.0, Testing Loss: 38178456.0
Epoch 927 - RMSE: 6178.871672993391, R-squared: 0.8551598678374659
Epoch 928 - Training Loss: 35614100.0, Testing Loss: 38122580.0
Epoch 928 - RMSE: 6174.348580091636, R-squared: 0.8553718436233456
Epoch 929 - Training Loss: 35601172.0, Testing Loss: 38079248.0
Epoch 929 - RMSE: 6170.838429793573, R-squared: 0.8555362406456539
Epoch 930 - Training Loss: 35588680.0, Testing Loss: 38099928.0
Epoch 930 - RMSE: 6172.513676978337, R-squared: 0.8554577925192107
Epoch 931 - Training Loss: 35576640.0, Testing Loss: 38152996.0
Epoch 931 - RMSE: 6176.811522127392, R-squared: 0.8552564365298368
Epoch 932 - Training Loss: 35562932.0, Testing Loss: 38033232.0
Epoch 932 - RMSE: 6167.108683815606, R-squared: 0.8557108199344273
Epoch 933 - Training Loss: 35553792.0, Testing Loss: 38046940.0
Epoch 933 - RMSE: 6168.219534666635, R-squared: 0.8556588350571535
Epoch 934 - Training Loss: 35540192.0, Testing Loss: 38008124.0
Epoch 934 - RMSE: 6165.07317081816, R-squared: 0.8558060522537572
Epoch 935 - Training Loss: 35529264.0, Testing Loss: 38063756.0
Epoch 935 - RMSE: 6169.583007927148, R-squared: 0.855595015321359
Epoch 936 - Training Loss: 35524288.0, Testing Loss: 37791000.0
Epoch 936 - RMSE: 6147.438602230558, R-squared: 0.8566297768982799
Epoch 937 - Training Loss: 35494576.0, Testing Loss: 37947108.0
Epoch 937 - RMSE: 6160.122712988383, R-squared: 0.8560375302726704
Epoch 938 - Training Loss: 35482120.0, Testing Loss: 37908424.0
Epoch 938 - RMSE: 6156.001744777404, R-squared: 0.8561042001000200

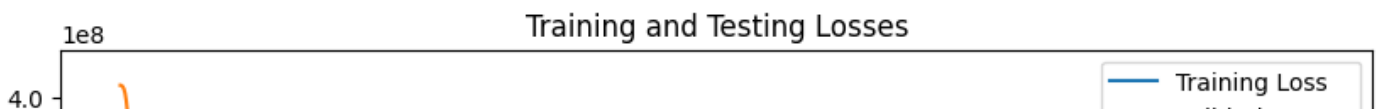
Epoch 938 - RMSE: 6156.981744777404, R-squared: 0.8561843021086362
Epoch 939 - Training Loss: 35468464.0, Testing Loss: 37963136.0
Epoch 939 - RMSE: 6161.422814864941, R-squared: 0.8559767569288368
Epoch 940 - Training Loss: 35461476.0, Testing Loss: 38047452.0
Epoch 940 - RMSE: 6168.26150250162, R-squared: 0.8556568708900982
Epoch 941 - Training Loss: 35442136.0, Testing Loss: 37891616.0
Epoch 941 - RMSE: 6155.616712305229, R-squared: 0.8562480643038116
Epoch 942 - Training Loss: 35430740.0, Testing Loss: 38008024.0
Epoch 942 - RMSE: 6165.064639802523, R-squared: 0.8558064513147051
Epoch 943 - Training Loss: 35419200.0, Testing Loss: 37833316.0
Epoch 943 - RMSE: 6150.879833001441, R-squared: 0.8564692195847905
Epoch 944 - Training Loss: 35404204.0, Testing Loss: 37799364.0
Epoch 944 - RMSE: 6148.118725095908, R-squared: 0.8565980515677044
Epoch 945 - Training Loss: 35403004.0, Testing Loss: 37991236.0
Epoch 945 - RMSE: 6163.702870230689, R-squared: 0.8558701446292852
Epoch 946 - Training Loss: 35382428.0, Testing Loss: 37755868.0
Epoch 946 - RMSE: 6144.580166916169, R-squared: 0.856763074441372
Epoch 947 - Training Loss: 35364756.0, Testing Loss: 37779304.0
Epoch 947 - RMSE: 6146.487404623668, R-squared: 0.8566741410217331
Epoch 948 - Training Loss: 35354016.0, Testing Loss: 37911072.0
Epoch 948 - RMSE: 6157.196814319066, R-squared: 0.8561742546802935
Epoch 949 - Training Loss: 35337864.0, Testing Loss: 37790508.0
Epoch 949 - RMSE: 6147.398997568045, R-squared: 0.8566316242078269
Epoch 950 - Training Loss: 35324972.0, Testing Loss: 37785056.0
Epoch 950 - RMSE: 6146.954783835391, R-squared: 0.8566523431819439
Epoch 951 - Training Loss: 35311928.0, Testing Loss: 37800128.0
Epoch 951 - RMSE: 6148.1810645461155, R-squared: 0.8565951434768411
Epoch 952 - Training Loss: 35300340.0, Testing Loss: 37809588.0
Epoch 952 - RMSE: 6148.95036777414, R-squared: 0.856559253603073
Epoch 953 - Training Loss: 35283312.0, Testing Loss: 37836136.0
Epoch 953 - RMSE: 6151.108330527019, R-squared: 0.8564585554072313
Epoch 954 - Training Loss: 35270240.0, Testing Loss: 37762632.0
Epoch 954 - RMSE: 6145.130809353677, R-squared: 0.8567374011287181
Epoch 955 - Training Loss: 35259348.0, Testing Loss: 37824100.0
Epoch 955 - RMSE: 6150.130277563663, R-squared: 0.8565041992054883
Epoch 956 - Training Loss: 35249876.0, Testing Loss: 37640128.0
Epoch 956 - RMSE: 6135.154924982288, R-squared: 0.8572021629446197
Epoch 957 - Training Loss: 35229480.0, Testing Loss: 37763016.0
Epoch 957 - RMSE: 6145.162141017202, R-squared: 0.8567359402429776
Epoch 958 - Training Loss: 35222080.0, Testing Loss: 37825904.0
Epoch 958 - RMSE: 6150.276824817938, R-squared: 0.856497360597134
Epoch 959 - Training Loss: 35204696.0, Testing Loss: 37676356.0
Epoch 959 - RMSE: 6138.10672693525, R-squared: 0.8570647214814275
Epoch 960 - Training Loss: 35192772.0, Testing Loss: 37782408.0
Epoch 960 - RMSE: 6146.7395037378865, R-squared: 0.8566623837168854
Epoch 961 - Training Loss: 35192048.0, Testing Loss: 37912072.0
Epoch 961 - RMSE: 6157.277812422251, R-squared: 0.8561704705916775
Epoch 962 - Training Loss: 35166192.0, Testing Loss: 37707476.0
Epoch 962 - RMSE: 6140.6414691041755, R-squared: 0.8569466463481435
Epoch 963 - Training Loss: 35158164.0, Testing Loss: 37735792.0
Epoch 963 - RMSE: 6142.946394491647, R-squared: 0.8568392343812399
Epoch 964 - Training Loss: 35140060.0, Testing Loss: 37622020.0
Epoch 964 - RMSE: 6133.679019535438, R-squared: 0.8572708590925675
Epoch 965 - Training Loss: 35126932.0, Testing Loss: 37652628.0
Epoch 965 - RMSE: 6136.17374766481, R-squared: 0.8571547321113041
Epoch 966 - Training Loss: 35116340.0, Testing Loss: 37562696.0
Epoch 966 - RMSE: 6128.841319063393, R-squared: 0.8574959144093555
Epoch 967 - Training Loss: 35098356.0, Testing Loss: 37608488.0
Epoch 967 - RMSE: 6132.576271871755, R-squared: 0.857322175790934
Epoch 968 - Training Loss: 35090196.0, Testing Loss: 37548232.0
Epoch 968 - RMSE: 6127.661059063514, R-squared: 0.857550794497951
Epoch 969 - Training Loss: 35079780.0, Testing Loss: 37695044.0
Epoch 969 - RMSE: 6139.629172197632, R-squared: 0.8569938077177789
Epoch 970 - Training Loss: 35065904.0, Testing Loss: 37479520.0
Epoch 970 - RMSE: 6122.051876932637, R-squared: 0.8578114674765724
Epoch 971 - Training Loss: 35058276.0, Testing Loss: 37740084.0
Epoch 971 - RMSE: 6143.296148911812, R-squared: 0.8568229319319666
Epoch 972 - Training Loss: 35041164.0, Testing Loss: 37438240.0
Epoch 972 - RMSE: 6118.679758383373, R-squared: 0.8579680635153454
Epoch 973 - Training Loss: 35026916.0, Testing Loss: 37546016.0
Epoch 973 - RMSE: 6127.480146098603, R-squared: 0.8575592057098109
Epoch 974 - Training Loss: 35007184.0, Testing Loss: 37567620.0
Epoch 974 - RMSE: 6122.051876932637, R-squared: 0.8578114674765724

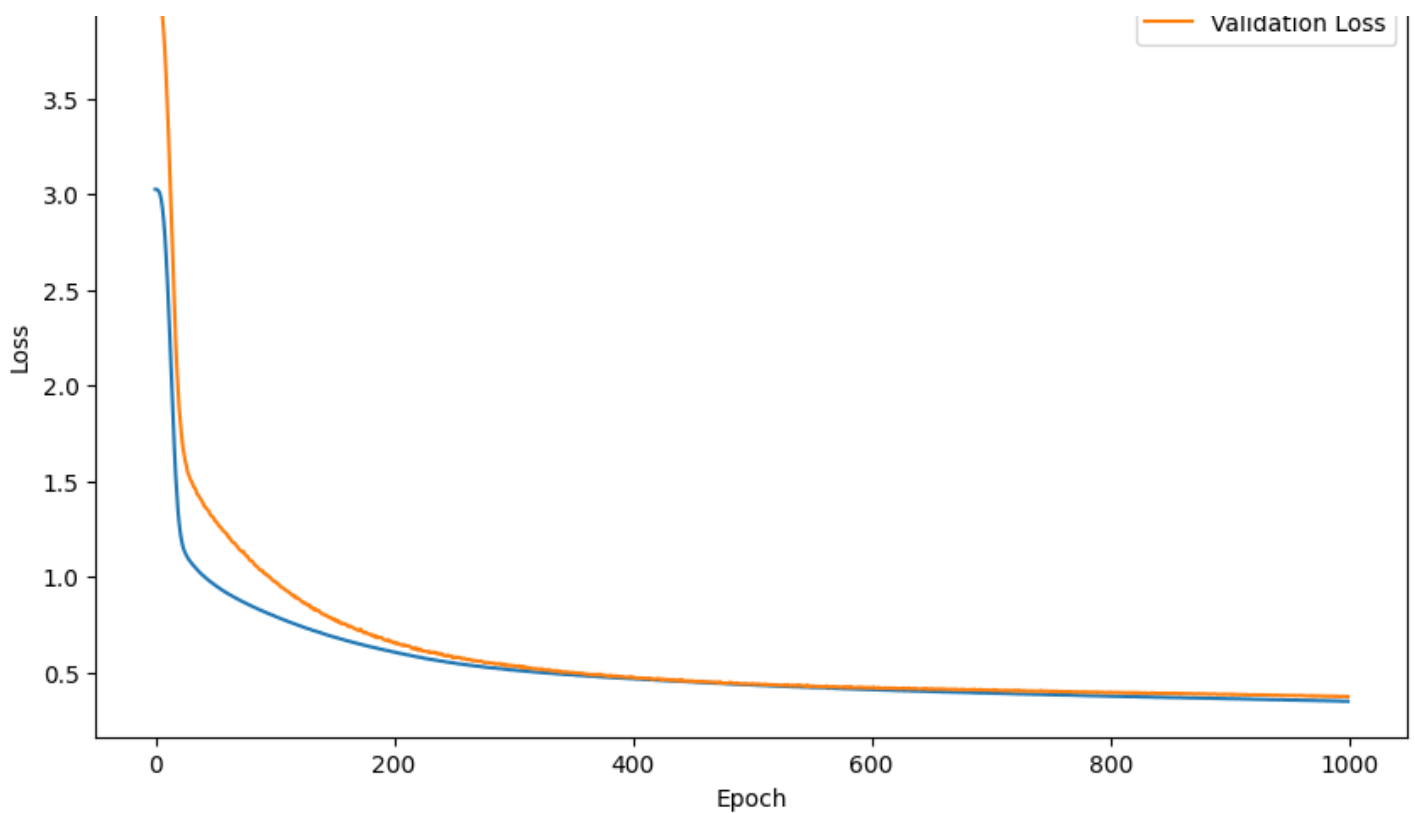
Epoch 974 - RMSE: 6129.242991817339, R-squared: 0.8574772348967921
Epoch 975 - Training Loss: 34996072.0, Testing Loss: 37602516.0
Epoch 975 - RMSE: 6132.088956084651, R-squared: 0.8573448502398476
Epoch 976 - Training Loss: 34982172.0, Testing Loss: 37516164.0
Epoch 976 - RMSE: 6125.044108985528, R-squared: 0.8576724405398755
Epoch 977 - Training Loss: 34970548.0, Testing Loss: 37604412.0
Epoch 977 - RMSE: 6132.243508011519, R-squared: 0.8573376592462815
Epoch 978 - Training Loss: 34953124.0, Testing Loss: 37481120.0
Epoch 978 - RMSE: 6122.182816620878, R-squared: 0.8578053850971354
Epoch 979 - Training Loss: 34939836.0, Testing Loss: 37462404.0
Epoch 979 - RMSE: 6120.653866008387, R-squared: 0.8578763994403245
Epoch 980 - Training Loss: 34929116.0, Testing Loss: 37418728.0
Epoch 980 - RMSE: 6117.084996785084, R-squared: 0.8580420917596016
Epoch 981 - Training Loss: 34917588.0, Testing Loss: 37546696.0
Epoch 981 - RMSE: 6127.535939718832, R-squared: 0.8575566117156814
Epoch 982 - Training Loss: 34906692.0, Testing Loss: 37333688.0
Epoch 982 - RMSE: 6110.130151364306, R-squared: 0.8583647075329048
Epoch 983 - Training Loss: 34887048.0, Testing Loss: 37441804.0
Epoch 983 - RMSE: 6118.970796892332, R-squared: 0.8579545515331025
Epoch 984 - Training Loss: 34878596.0, Testing Loss: 37346100.0
Epoch 984 - RMSE: 6111.145738595135, R-squared: 0.8583176201729836
Epoch 985 - Training Loss: 34870256.0, Testing Loss: 37297884.0
Epoch 985 - RMSE: 6107.199142342873, R-squared: 0.8585005588946335
Epoch 986 - Training Loss: 34855924.0, Testing Loss: 37525484.0
Epoch 986 - RMSE: 6125.804843176001, R-squared: 0.8576370840060727
Epoch 987 - Training Loss: 34834784.0, Testing Loss: 37432252.0
Epoch 987 - RMSE: 6118.19033421762, R-squared: 0.8579907844566639
Epoch 988 - Training Loss: 34822216.0, Testing Loss: 37440152.0
Epoch 988 - RMSE: 6118.835682851853, R-squared: 0.8579608245235175
Epoch 989 - Training Loss: 34817592.0, Testing Loss: 37221464.0
Epoch 989 - RMSE: 6100.939719062957, R-squared: 0.8587904629846795
Epoch 990 - Training Loss: 34806940.0, Testing Loss: 37477776.0
Epoch 990 - RMSE: 6121.909305380047, R-squared: 0.857818090028684
Epoch 991 - Training Loss: 34785740.0, Testing Loss: 37333588.0
Epoch 991 - RMSE: 6110.121818157719, R-squared: 0.8583650938668512
Epoch 992 - Training Loss: 34770780.0, Testing Loss: 37380932.0
Epoch 992 - RMSE: 6113.994818910788, R-squared: 0.8581854817514764
Epoch 993 - Training Loss: 34764140.0, Testing Loss: 37165824.0
Epoch 993 - RMSE: 6096.378094532892, R-squared: 0.8590015465575558
Epoch 994 - Training Loss: 34742844.0, Testing Loss: 37342040.0
Epoch 994 - RMSE: 6110.813222914091, R-squared: 0.8583330380122342
Epoch 995 - Training Loss: 34730308.0, Testing Loss: 37310180.0
Epoch 995 - RMSE: 6108.205919512594, R-squared: 0.8584539024337225
Epoch 996 - Training Loss: 34715620.0, Testing Loss: 37294132.0
Epoch 996 - RMSE: 6106.892135719491, R-squared: 0.8585147847853318
Epoch 997 - Training Loss: 34703980.0, Testing Loss: 37297160.0
Epoch 997 - RMSE: 6107.139961905369, R-squared: 0.8585033012182627
Epoch 998 - Training Loss: 34691352.0, Testing Loss: 37225312.0
Epoch 998 - RMSE: 6101.2554740614805, R-squared: 0.858775845967294
Epoch 999 - Training Loss: 34679504.0, Testing Loss: 37215136.0
Epoch 999 - RMSE: 6100.42114184314, R-squared: 0.8588144674627806
Epoch 1000 - Training Loss: 34664868.0, Testing Loss: 37246412.0
Epoch 1000 - RMSE: 6102.983849917865, R-squared: 0.8586958221124876

Wyświetlmy 'train_losses' i 'test_losses' na wykresie.

In [18]:

```
# Plot the training and testing losses
plt.figure(figsize=(10, 6))
plt.plot(train_losses, label='Training Loss')
plt.plot(test_losses, label='Validation Loss')
plt.xlabel('Epoch')
plt.ylabel('Loss')
plt.title('Training and Testing Losses')
plt.legend()
plt.show()
```

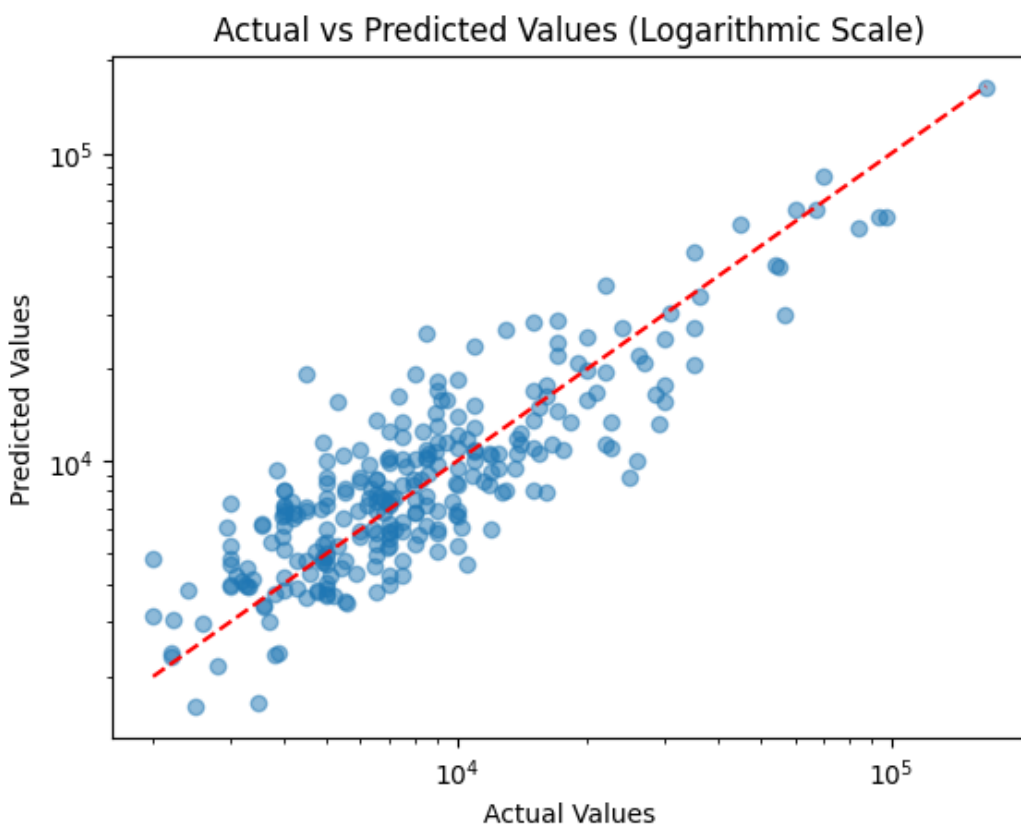




Na początku uczenia Validation Loss jest nad Training Loss co wskazuje na overfitting, lecz obie wartości szybko spadają by połączyć się około 300 epoki. Wskazuje to że model jest dobrze wytrenowany i nie występuje overfitting i underfitting.

In [19]:

```
# Plot the predicted values and actual values with logarithmic scale
plt.scatter(y_test, predictions, alpha=0.5)
plt.plot([y_test.min(), y_test.max()], [y_test.min(), y_test.max()], 'r--')
plt.xlabel('Actual Values')
plt.ylabel('Predicted Values')
plt.title('Actual vs Predicted Values (Logarithmic Scale)')
plt.xscale('log')
plt.yscale('log')
plt.show()
```



3. Porównanie modeli

By porównać modele wyświetlimy ich dokładność na wykresie.

In [20]:

```
import matplotlib.pyplot as plt

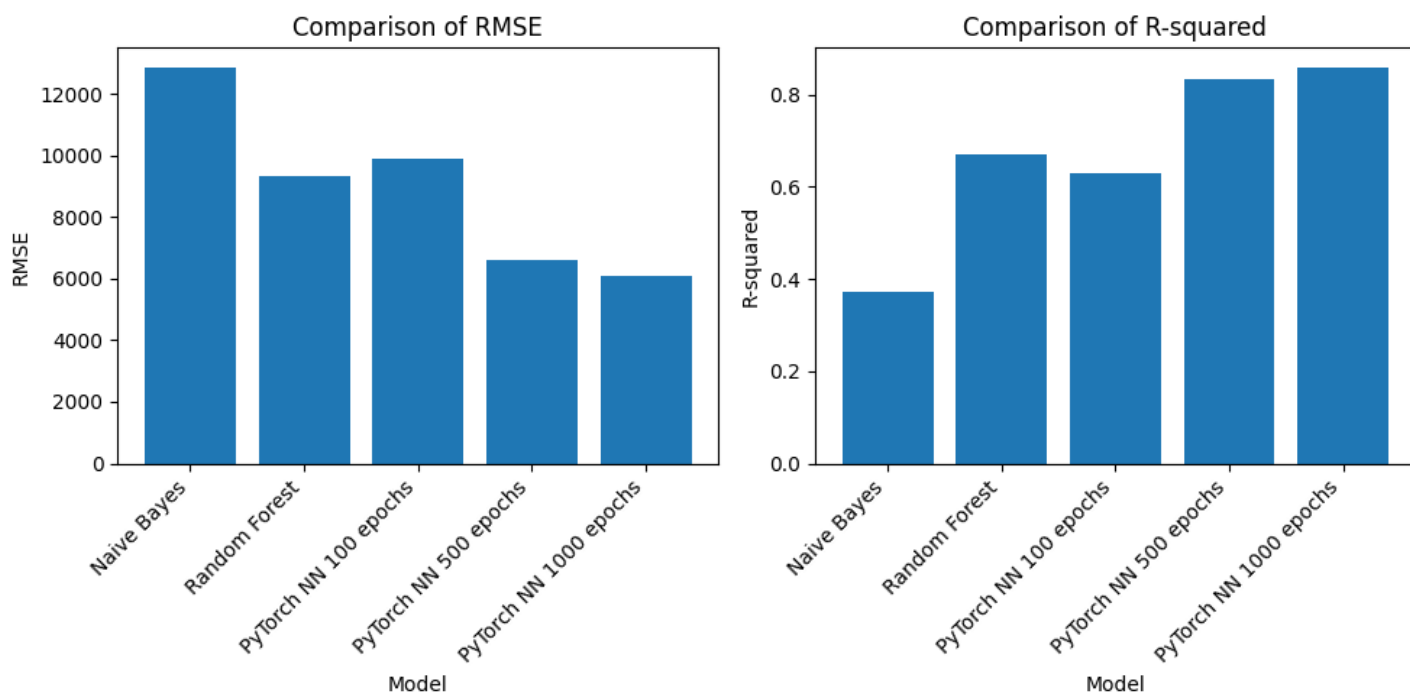
# Create lists of RMSE and R-squared values
rmse_values = [naive_bayes_rmse, random_forest_rmse, nn_rmse[99], nn_rmse[499], nn_rmse[999]]
r2_values = [naive_bayes_r2, random_forest_r2, nn_r2[99], nn_r2[499], nn_r2[999]]

# Define the models' names for plotting
model_names = ['Naive Bayes', 'Random Forest', 'PyTorch NN 100 epochs', 'PyTorch NN 500 epochs', 'PyTorch NN 1000 epochs']

# Plotting RMSE values
plt.figure(figsize=(10, 5))
plt.subplot(1, 2, 1)
plt.bar(model_names, rmse_values)
plt.xlabel('Model')
plt.ylabel('RMSE')
plt.title('Comparison of RMSE')
plt.xticks(rotation=45, ha='right') # Rotate x-axis labels by 45 degrees

# Plotting R-squared values
plt.subplot(1, 2, 2)
plt.bar(model_names, r2_values)
plt.xlabel('Model')
plt.ylabel('R-squared')
plt.title('Comparison of R-squared')
plt.xticks(rotation=45, ha='right') # Rotate x-axis labels by 45 degrees

# Adjust the layout and display the plot
plt.tight_layout()
plt.show()
```



Z wykresu widać iż model stworzony w PyTorch jest najdokładniejszy z wszystkich użytych. Już przy 100 epokach model zbliża się do Random Forest a przy 500 wyprzedza go o około 16 punktów procentowych. Przy 1000 jest jeszcze lepszy lecz tempo wzrostu dokładności spada.

Ocenianie win

Teraz postaramy się przewidzieć ocenę wina za pomocą tych samych modeli co poprzednio.

1. Przygotowanie danych

In [62]:

```
wines = pd.read_csv('winequalityN.csv', delimiter=',')
wines.head()
```

Out[62]:

	type	fixed acidity	volatile acidity	citric acid	residual sugar	chlorides	free sulfur dioxide	total sulfur dioxide	density	pH	sulphates	alcohol	quality
0	white	7.0	0.27	0.36	20.7	0.045	45.0	170.0	1.0010	3.00	0.45	8.8	6
1	white	6.3	0.30	0.34	1.6	0.049	14.0	132.0	0.9940	3.30	0.49	9.5	6
2	white	8.1	0.28	0.40	6.9	0.050	30.0	97.0	0.9951	3.26	0.44	10.1	6
3	white	7.2	0.23	0.32	8.5	0.058	47.0	186.0	0.9956	3.19	0.40	9.9	6
4	white	7.2	0.23	0.32	8.5	0.058	47.0	186.0	0.9956	3.19	0.40	9.9	6

In [63]:

```
wines = wines.fillna(0)
wines.isnull().sum()
```

Out[63]:

```
type                0
fixed acidity       0
volatile acidity    0
citric acid         0
residual sugar      0
chlorides           0
free sulfur dioxide 0
total sulfur dioxide 0
density             0
pH                  0
sulphates           0
alcohol             0
quality             0
dtype: int64
```

Tak jak w przypadku komórek trzeba zamienić ciąg znaków na wartość liczbową.

In [64]:

```
text_cols = ['type']
from sklearn.preprocessing import LabelEncoder

label_encoder = LabelEncoder()
for col in text_cols:
    wines[col] = label_encoder.fit_transform(wines[col].astype(str))

wines.head()
```

Out[64]:

	type	fixed acidity	volatile acidity	citric acid	residual sugar	chlorides	free sulfur dioxide	total sulfur dioxide	density	pH	sulphates	alcohol	quality
0	1	7.0	0.27	0.36	20.7	0.045	45.0	170.0	1.0010	3.00	0.45	8.8	6
1	1	6.3	0.30	0.34	1.6	0.049	14.0	132.0	0.9940	3.30	0.49	9.5	6
2	1	8.1	0.28	0.40	6.9	0.050	30.0	97.0	0.9951	3.26	0.44	10.1	6
3	1	7.2	0.23	0.32	8.5	0.058	47.0	186.0	0.9956	3.19	0.40	9.9	6

4	1	7.2	0.22	0.22	8.5	0.058	47.0	186.0	0.9956	3.19	0.40	9.9	6
type	fixed acidity	volatile acidity	chloride	residual sugar	chlorides	free sulfur dioxide	total sulfur dioxide	density	pH	sulphates	alcohol	quality	

Musimy także podzielić dane na zbiory.

In [65]:

```
X = wines.drop('quality', axis=1)
y = wines['quality']

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

2. Proste modele

In [66]:

```
# Initialize the models
decision_tree_model = DecisionTreeRegressor()
knn_model = KNeighborsRegressor()
naive_bayes_model = GaussianNB()
random_forest_model = RandomForestRegressor()
gradient_boosting_model = GradientBoostingRegressor()

# Train the models
decision_tree_model.fit(X_train, y_train)
knn_model.fit(X_train, y_train)
naive_bayes_model.fit(X_train, y_train)
random_forest_model.fit(X_train, y_train)
gradient_boosting_model.fit(X_train, y_train)

# Make predictions
decision_tree_predictions = decision_tree_model.predict(X_test)
knn_predictions = knn_model.predict(X_test)
naive_bayes_predictions = naive_bayes_model.predict(X_test)
random_forest_predictions = random_forest_model.predict(X_test)
gradient_boosting_predictions = gradient_boosting_model.predict(X_test)
```

In [67]:

```
# Calculate RMSE for each model
decision_tree_rmse = mean_squared_error(y_test, decision_tree_predictions, squared=False)
knn_rmse = mean_squared_error(y_test, knn_predictions, squared=False)
naive_bayes_rmse = mean_squared_error(y_test, naive_bayes_predictions, squared=False)
random_forest_rmse = mean_squared_error(y_test, random_forest_predictions, squared=False)
gradient_boosting_rmse = mean_squared_error(y_test, gradient_boosting_predictions, squared=False)

# Calculate R-squared for each model
decision_tree_r2 = r2_score(y_test, decision_tree_predictions)
knn_r2 = r2_score(y_test, knn_predictions)
naive_bayes_r2 = r2_score(y_test, naive_bayes_predictions)
random_forest_r2 = r2_score(y_test, random_forest_predictions)
gradient_boosting_r2 = r2_score(y_test, gradient_boosting_predictions)
```

In [83]:

```
import numpy as np
from sklearn.model_selection import learning_curve, cross_val_score

# Learning curves
def plot_learning_curve(estimator, title, X, y, cv, train_sizes=np.linspace(.1, 1.0, 5)):
```

```

    train_sizes, train_scores, test_scores = learning_curve(estimator, X, y, cv=cv, train_sizes=train_sizes)
    train_scores_mean = np.mean(train_scores, axis=1)
    train_scores_std = np.std(train_scores, axis=1)
    test_scores_mean = np.mean(test_scores, axis=1)
    test_scores_std = np.std(test_scores, axis=1)
```

```

plt.figure()
plt.title(title)
plt.xlabel("Training examples")
plt.ylabel("Score")
plt.grid()
plt.fill_between(train_sizes, train_scores_mean - train_scores_std, train_scores_mean + train_scores_std, alpha=0.1, color="r")
plt.fill_between(train_sizes, test_scores_mean - test_scores_std, test_scores_mean + test_scores_std, alpha=0.1, color="g")
plt.plot(train_sizes, train_scores_mean, 'o-', color="r", label="Training score")
plt.plot(train_sizes, test_scores_mean, 'o-', color="g", label="Cross-validation score")
plt.legend(loc="best")
return plt

# Metrics and cross-validation
def evaluate_model(estimator, X, y, cv):
    # Calculate metrics
    predictions = estimator.predict(X)
    rmse = mean_squared_error(y, predictions, squared=False)
    r2 = r2_score(y, predictions)

    # Perform cross-validation
    scores = cross_val_score(estimator, X, y, cv=cv, scoring='neg_mean_squared_error')
    cv_rmse = np.sqrt(-scores)
    cv_r2 = cross_val_score(estimator, X, y, cv=cv, scoring='r2')

    return rmse, r2, cv_rmse, cv_r2

# Define the models
models = {
    'Decision Tree': decision_tree_model,
    'K-Nearest Neighbors': knn_model,
    'Random Forest': random_forest_model,
    'Gradient Boosting': gradient_boosting_model
}

# Initialize lists to store results
learning_curve_plots = []
metrics = {}
cross_val_results = {}

# Evaluate each model
for name, model in models.items():
    # Learning curves
    plot = plot_learning_curve(model, f"{name} Learning Curve", X_train, y_train, cv=5)
    learning_curve_plots.append(plot)

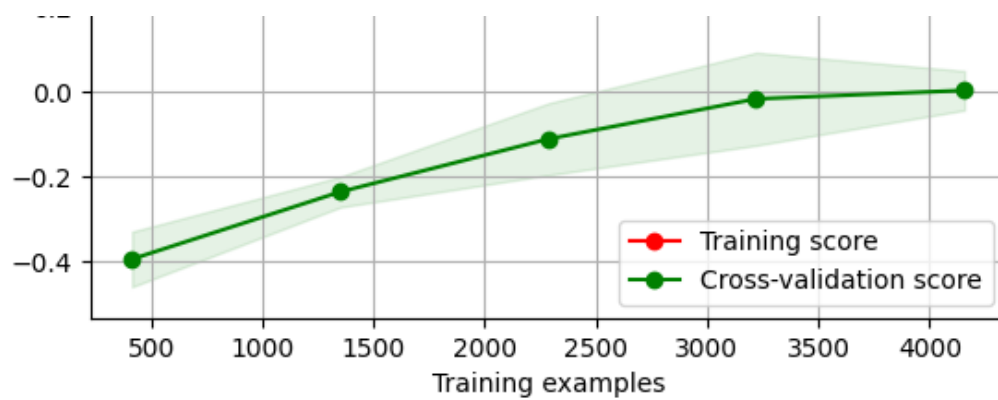
    # Metrics and cross-validation
    rmse, r2, cv_rmse, cv_r2 = evaluate_model(model, X_test, y_test, cv=5)
    metrics[name] = {'RMSE': rmse, 'R-squared': r2}
    cross_val_results[name] = {'RMSE': cv_rmse, 'R-squared': cv_r2}

# Show learning curves
for plot in learning_curve_plots:
    plot.show()

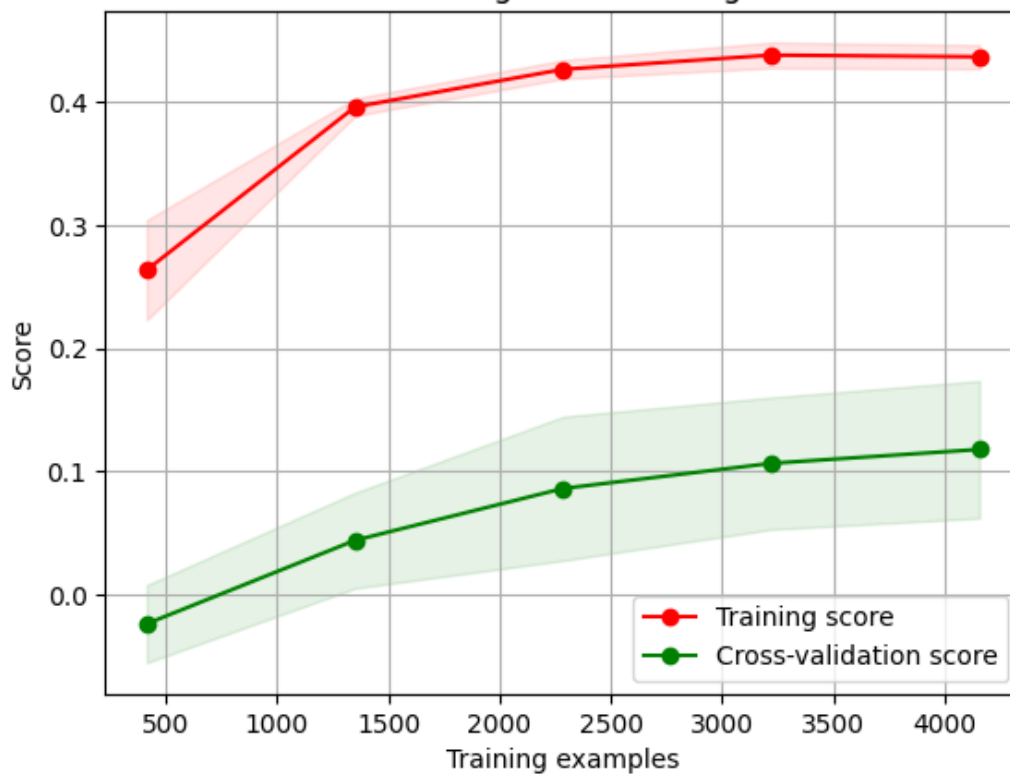
```

Decision Tree Learning Curve

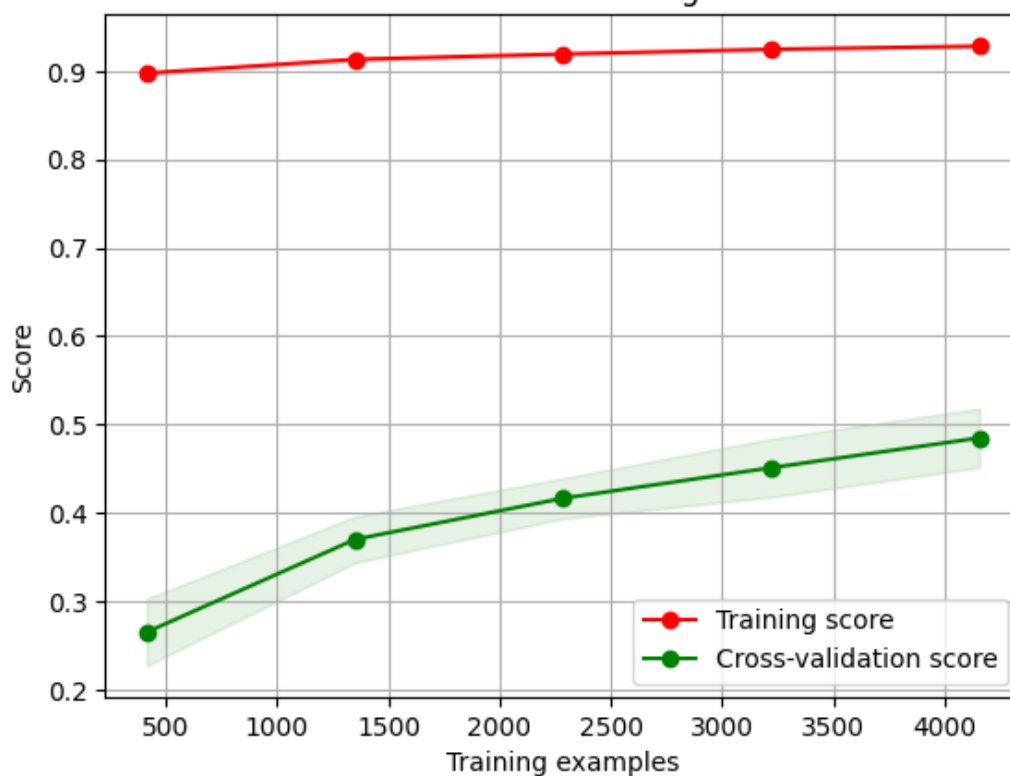




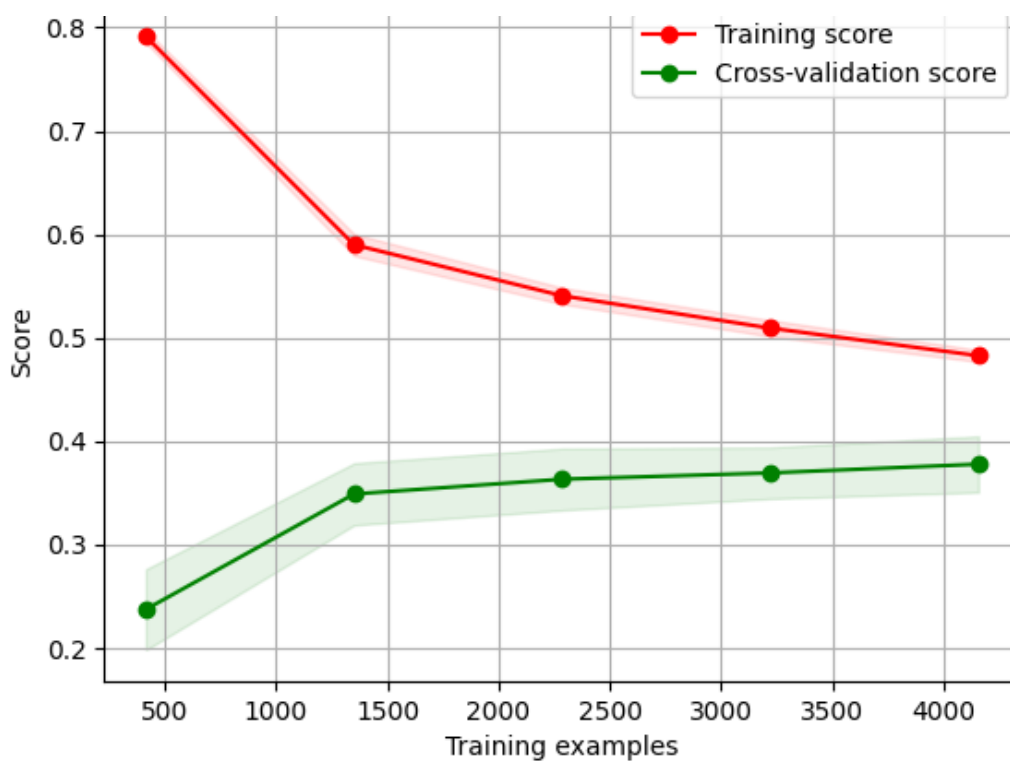
K-Nearest Neighbors Learning Curve



Random Forest Learning Curve



Gradient Boosting Learning Curve



In [84]:

```
# Print metrics and cross-validation results
for name, metric_values in metrics.items():
    print(f"{name}:")
    print(f"  RMSE: {metric_values['RMSE']}")
    print(f"  R-squared: {metric_values['R-squared']}\n")

for name, cv_results in cross_val_results.items():
    print(f"{name} Cross-Validation:")
    print(f"  RMSE: {np.mean(cv_results['RMSE'])} (+/- {np.std(cv_results['RMSE'])})")
    print(f"  R-squared: {np.mean(cv_results['R-squared'])} (+/- {np.std(cv_results['R-squared'])})\n")
```

Decision Tree:
 RMSE: 0.7760848486523186
 R-squared: 0.15737522257661563

K-Nearest Neighbors:
 RMSE: 0.7874594006628581
 R-squared: 0.13249465443609365

Random Forest:
 RMSE: 0.5584099679515869
 R-squared: 0.5637633597707306

Gradient Boosting:
 RMSE: 0.6404739912382691
 R-squared: 0.4261230091985697

Decision Tree Cross-Validation:
 RMSE: 0.9217334321859759 (+/- 0.04411282726285253)
 R-squared: -0.1742390077809015 (+/- 0.10444011088253681)

K-Nearest Neighbors Cross-Validation:
 RMSE: 0.8314230419475408 (+/- 0.02930532787352442)
 R-squared: 0.029970857854852873 (+/- 0.023658837493364122)

Random Forest Cross-Validation:
 RMSE: 0.6649716871411008 (+/- 0.029272616383725223)
 R-squared: 0.3806919331046699 (+/- 0.04029329030383343)

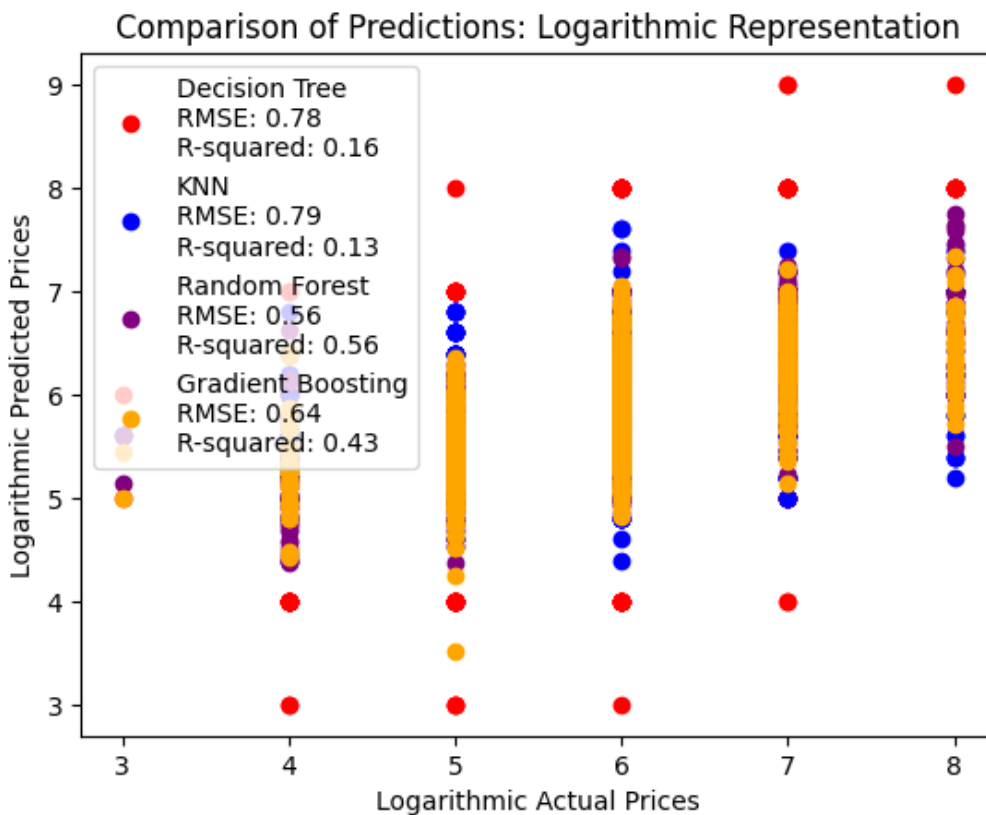
Gradient Boosting Cross-Validation:
 RMSE: 0.6726992576660115 (+/- 0.022209600172256885)
 R-squared: 0.3640009303431374 (+/- 0.0320058965596717)

In [85]:

```
import numpy as np

# Plotting the logarithmic predictions
plt.scatter(y_test, decision_tree_predictions, color='red', label=f"Decision Tree\nRMSE: {decision_tree_rmse:.2f}\nR-squared: {decision_tree_r2:.2f}")
plt.scatter(y_test, knn_predictions, color='blue', label=f"KNN\nRMSE: {knn_rmse:.2f}\nR-squared: {knn_r2:.2f}")
plt.scatter(y_test, random_forest_predictions, color='purple', label=f"Random Forest\nRMSE: {random_forest_rmse:.2f}\nR-squared: {random_forest_r2:.2f}")
plt.scatter(y_test, gradient_boosting_predictions, color='orange', label=f"Gradient Boosting\nRMSE: {gradient_boosting_rmse:.2f}\nR-squared: {gradient_boosting_r2:.2f}")

# Plot settings
plt.xlabel('Logarithmic Actual Prices')
plt.ylabel('Logarithmic Predicted Prices')
plt.title('Comparison of Predictions: Logarithmic Representation')
plt.legend()
plt.show()
```



Tak jak w poprzednim przypadku 'Random Forest' jest najlepszym z prostych modeli.

3. Zaawansowany model

In [87]:

```
# Normalize the numerical features
numerical_features = X.values
scaler = StandardScaler()
numerical_features_scaled = scaler.fit_transform(numerical_features)

# Concatenate the encoded categorical features and the scaled numerical features
X_scaled = numerical_features_scaled
```

Przy danych z winem użyjemy tego samego modelu

In [88]:

```
import torch
```

```

import torch.nn as nn
import torch.optim as optim
from torch.utils.data import TensorDataset, DataLoader

# Convert X_scaled and y to PyTorch tensors
X_tensor = torch.tensor(X_scaled, dtype=torch.float32)
y_tensor = torch.tensor(y.values, dtype=torch.float32)

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X_tensor, y_tensor, test_size=0.2, random_state=42)

# Define the neural network model
class MobilePricePredictionModel(nn.Module):
    def __init__(self, input_size):
        super(MobilePricePredictionModel, self).__init__()
        self.fc1 = nn.Linear(input_size, 64)
        self.relu = nn.ReLU()
        self.fc2 = nn.Linear(64, 32)
        self.fc3 = nn.Linear(32, 1)

    def forward(self, x):
        x = self.fc1(x)
        x = self.relu(x)
        x = self.fc2(x)
        x = self.relu(x)
        x = self.fc3(x)
        return x

# Instantiate the model
input_size = X_train.shape[1]
model = MobilePricePredictionModel(input_size)

# Define the loss function and optimizer
criterion = nn.MSELoss()
optimizer = optim.Adam(model.parameters(), lr=0.001)

# Create the dataloaders
batch_size = 32
train_dataset = TensorDataset(X_train, y_train)
train_dataloader = DataLoader(train_dataset, batch_size=batch_size, shuffle=True)

```

In [89]:

```

# Initialize variables to store RMSE and R-squared values
nn_rmse = []
nn_r2 = []
num_epochs = 1000
train_losses = []
test_losses = []

model.train()
for epoch in range(num_epochs):
    running_loss = 0.0

    for batch_features, batch_targets in train_dataloader:
        optimizer.zero_grad()
        outputs = model(batch_features)
        loss = criterion(outputs, batch_targets.unsqueeze(1))
        loss.backward()
        optimizer.step()
        running_loss += loss.item() * batch_features.size(0)

    epoch_loss = running_loss / len(train_dataset)
    train_losses.append(epoch_loss)

    model.eval()
    with torch.no_grad():
        y_pred_train = model(X_train)
        train_loss = criterion(y_pred_train, y_train.unsqueeze(1))

```

```

y_pred_test = model(X_test)
test_loss = criterion(y_pred_test, y_test.unsqueeze(1))
predictions = y_pred_test.squeeze().tolist()

nn_rmse.append(mean_squared_error(y_test, predictions, squared=False))
nn_r2.append(r2_score(y_test, predictions))

test_losses.append(test_loss.item())

print(f"Epoch {epoch+1} - Training Loss: {train_loss.item()}, Testing Loss: {test_loss.item()}")
print(f"Epoch {epoch+1} - RMSE: {nn_rmse[-1]}, R-squared: {nn_r2[-1]}")

```

```

Epoch 1 - Training Loss: 1.642877459526062, Testing Loss: 1.3668850660324097
Epoch 1 - RMSE: 1.1691385845252684, R-squared: -0.9122638009193329
Epoch 2 - Training Loss: 1.0683902502059937, Testing Loss: 0.9325861930847168
Epoch 2 - RMSE: 0.9657049616198794, R-squared: -0.30468221505818804
Epoch 3 - Training Loss: 0.8186948895454407, Testing Loss: 0.713138997554779
Epoch 3 - RMSE: 0.8444755438514522, R-squared: 0.0023229765542320813
Epoch 4 - Training Loss: 0.6578351259231567, Testing Loss: 0.5782946944236755
Epoch 4 - RMSE: 0.7604569219635259, R-squared: 0.1909692076350853
Epoch 5 - Training Loss: 0.5920329093933105, Testing Loss: 0.5256101489067078
Epoch 5 - RMSE: 0.7249897422255744, R-squared: 0.2646746463306897
Epoch 6 - Training Loss: 0.5532680153846741, Testing Loss: 0.4921177327632904
Epoch 6 - RMSE: 0.7015110535807241, R-squared: 0.31153026447377363
Epoch 7 - Training Loss: 0.5356357097625732, Testing Loss: 0.47332414984703064
Epoch 7 - RMSE: 0.6879856008795239, R-squared: 0.33782235580659115
Epoch 8 - Training Loss: 0.5320783257484436, Testing Loss: 0.4922943115234375
Epoch 8 - RMSE: 0.7016368866852677, R-squared: 0.31128325466952556
Epoch 9 - Training Loss: 0.5062111616134644, Testing Loss: 0.4518205523490906
Epoch 9 - RMSE: 0.6721759853619509, R-squared: 0.3679058051309111
Epoch 10 - Training Loss: 0.4996594190597534, Testing Loss: 0.4593053162097931
Epoch 10 - RMSE: 0.6777206783343596, R-squared: 0.3574346680854763
Epoch 11 - Training Loss: 0.5079157948493958, Testing Loss: 0.46410635113716125
Epoch 11 - RMSE: 0.6812535281005946, R-squared: 0.35071802609561653
Epoch 12 - Training Loss: 0.49482348561286926, Testing Loss: 0.4567331075668335
Epoch 12 - RMSE: 0.6758203448755667, R-squared: 0.36103313119433345
Epoch 13 - Training Loss: 0.4916795492172241, Testing Loss: 0.4505438208580017
Epoch 13 - RMSE: 0.6712255979785151, R-squared: 0.369691973256147
Epoch 14 - Training Loss: 0.4985288977622986, Testing Loss: 0.45770323276519775
Epoch 14 - RMSE: 0.6765376876591424, R-squared: 0.35967596124325474
Epoch 15 - Training Loss: 0.47904491424560547, Testing Loss: 0.44601136445999146
Epoch 15 - RMSE: 0.6678408092172121, R-squared: 0.376032852788184
Epoch 16 - Training Loss: 0.4687827527523041, Testing Loss: 0.43873149156570435
Epoch 16 - RMSE: 0.662368090507287, R-squared: 0.38621733121414914
Epoch 17 - Training Loss: 0.4767003357410431, Testing Loss: 0.4409250020980835
Epoch 17 - RMSE: 0.664021851128839, R-squared: 0.3831485941187024
Epoch 18 - Training Loss: 0.47215795516967773, Testing Loss: 0.43073731660842896
Epoch 18 - RMSE: 0.6563058063109704, R-squared: 0.3974011344642878
Epoch 19 - Training Loss: 0.46336138248443604, Testing Loss: 0.4293785095214844
Epoch 19 - RMSE: 0.6552698116403978, R-squared: 0.39930206686299496
Epoch 20 - Training Loss: 0.4653569161891937, Testing Loss: 0.44707030057907104
Epoch 20 - RMSE: 0.6686331449789713, R-squared: 0.3745514076456019
Epoch 21 - Training Loss: 0.46559613943099976, Testing Loss: 0.4444100260734558
Epoch 21 - RMSE: 0.6666408536233641, R-squared: 0.3782730879112395
Epoch 22 - Training Loss: 0.46352434158325195, Testing Loss: 0.4411878287792206
Epoch 22 - RMSE: 0.6642197440952816, R-squared: 0.3827808690379756
Epoch 23 - Training Loss: 0.47500646114349365, Testing Loss: 0.43893715739250183
Epoch 23 - RMSE: 0.6625233135432307, R-squared: 0.3859296229925363
Epoch 24 - Training Loss: 0.4527049660682678, Testing Loss: 0.4341285228729248
Epoch 24 - RMSE: 0.6588843112896131, R-squared: 0.39265683244667093
Epoch 25 - Training Loss: 0.4675479531288147, Testing Loss: 0.4364032447338104
Epoch 25 - RMSE: 0.6606082168197341, R-squared: 0.38947456837969774
Epoch 26 - Training Loss: 0.447033554315567, Testing Loss: 0.43421798944473267
Epoch 26 - RMSE: 0.6589522136740992, R-squared: 0.39253164453856204
Epoch 27 - Training Loss: 0.45023760199546814, Testing Loss: 0.4344589412212372
Epoch 27 - RMSE: 0.6591349861366396, R-squared: 0.3921946128606021
Epoch 28 - Training Loss: 0.48083680868148804, Testing Loss: 0.4584667384624481
Epoch 28 - RMSE: 0.6771017461932045, R-squared: 0.358607784818031
Epoch 29 - Training Loss: 0.443751722574234, Testing Loss: 0.4279073476791382
Epoch 29 - RMSE: 0.6541462720265212, R-squared: 0.40136023986624936
Epoch 30 - Training Loss: 0.46421077847480774, Testing Loss: 0.45073965191841125

```


Epoch 30 - RMSE: 0.6713714760667804, R-squared: 0.3694179726166503
Epoch 31 - Training Loss: 0.44840002059936523, Testing Loss: 0.42883309721946716
Epoch 31 - RMSE: 0.6548534831592893, R-squared: 0.40006513638499763
Epoch 32 - Training Loss: 0.43770161271095276, Testing Loss: 0.43627408146858215
Epoch 32 - RMSE: 0.6605104751302214, R-squared: 0.3896552181841565
Epoch 33 - Training Loss: 0.43948355317115784, Testing Loss: 0.42170241475105286
Epoch 33 - RMSE: 0.6493862066993152, R-squared: 0.41004085669258417
Epoch 34 - Training Loss: 0.43857818841934204, Testing Loss: 0.43493667244911194
Epoch 34 - RMSE: 0.6594972582599141, R-squared: 0.3915263083003272
Epoch 35 - Training Loss: 0.4383595287799835, Testing Loss: 0.43639442324638367
Epoch 35 - RMSE: 0.6606015620597144, R-squared: 0.38948686880123573
Epoch 36 - Training Loss: 0.44038036465644836, Testing Loss: 0.4443034827709198
Epoch 36 - RMSE: 0.6665609560100129, R-squared: 0.3784221082402265
Epoch 37 - Training Loss: 0.46186089515686035, Testing Loss: 0.4677119255065918
Epoch 37 - RMSE: 0.6838946842557652, R-squared: 0.3456738562608702
Epoch 38 - Training Loss: 0.43479275703430176, Testing Loss: 0.42897310853004456
Epoch 38 - RMSE: 0.6549603777832256, R-squared: 0.39986926036882664
Epoch 39 - Training Loss: 0.43069127202033997, Testing Loss: 0.4417678713798523
Epoch 39 - RMSE: 0.6646561804055088, R-squared: 0.38196949496571764
Epoch 40 - Training Loss: 0.42219293117523193, Testing Loss: 0.4250328242778778
Epoch 40 - RMSE: 0.6519454347512361, R-squared: 0.40538164123756915
Epoch 41 - Training Loss: 0.4361015856266022, Testing Loss: 0.4520290493965149
Epoch 41 - RMSE: 0.6723310754014088, R-squared: 0.3676140874109034
Epoch 42 - Training Loss: 0.44289708137512207, Testing Loss: 0.4474255442619324
Epoch 42 - RMSE: 0.6688987421037845, R-squared: 0.3740544225888687
Epoch 43 - Training Loss: 0.4428524971008301, Testing Loss: 0.43885451555252075
Epoch 43 - RMSE: 0.6624609475954, R-squared: 0.386045227312523
Epoch 44 - Training Loss: 0.43330222368240356, Testing Loss: 0.4460483491420746
Epoch 44 - RMSE: 0.667868516572546, R-squared: 0.3759810774613165
Epoch 45 - Training Loss: 0.4240376949310303, Testing Loss: 0.4299924373626709
Epoch 45 - RMSE: 0.6557380898451391, R-squared: 0.39844320153519674
Epoch 46 - Training Loss: 0.41687262058258057, Testing Loss: 0.42326614260673523
Epoch 46 - RMSE: 0.6505890814456353, R-squared: 0.40785323953608743
Epoch 47 - Training Loss: 0.4180751144886017, Testing Loss: 0.41784340143203735
Epoch 47 - RMSE: 0.6464080726799428, R-squared: 0.4154396426888213
Epoch 48 - Training Loss: 0.414608895778656, Testing Loss: 0.42688071727752686
Epoch 48 - RMSE: 0.6533611100438974, R-squared: 0.40279645410925746
Epoch 49 - Training Loss: 0.422209769487381, Testing Loss: 0.4282289147377014
Epoch 49 - RMSE: 0.6543920298238571, R-squared: 0.4009103465284797
Epoch 50 - Training Loss: 0.4198417663574219, Testing Loss: 0.43260112404823303
Epoch 50 - RMSE: 0.6577241752841215, R-squared: 0.39479371853902057
Epoch 51 - Training Loss: 0.42929866909980774, Testing Loss: 0.4423738121986389
Epoch 51 - RMSE: 0.665111895236406, R-squared: 0.3811217116180029
Epoch 52 - Training Loss: 0.4125969111919403, Testing Loss: 0.4270080029964447
Epoch 52 - RMSE: 0.6534584642439581, R-squared: 0.402618467987368
Epoch 53 - Training Loss: 0.41770079731941223, Testing Loss: 0.4270203113555908
Epoch 53 - RMSE: 0.6534679019742677, R-squared: 0.40260121221117673
Epoch 54 - Training Loss: 0.4194696843624115, Testing Loss: 0.4377269148826599
Epoch 54 - RMSE: 0.661609338296898, R-squared: 0.387622719623233
Epoch 55 - Training Loss: 0.4096560776233673, Testing Loss: 0.4298236072063446
Epoch 55 - RMSE: 0.6556093500502107, R-squared: 0.39867938332126795
Epoch 56 - Training Loss: 0.4290197789669037, Testing Loss: 0.4479779899120331
Epoch 56 - RMSE: 0.6693115986736471, R-squared: 0.3732814939517132
Epoch 57 - Training Loss: 0.41107288002967834, Testing Loss: 0.43431729078292847
Epoch 57 - RMSE: 0.6590275464251104, R-squared: 0.392392742575
Epoch 58 - Training Loss: 0.40822699666023254, Testing Loss: 0.4241657555103302
Epoch 58 - RMSE: 0.6512801042972686, R-squared: 0.4065946747567959
Epoch 59 - Training Loss: 0.40389734506607056, Testing Loss: 0.4290289282798767
Epoch 59 - RMSE: 0.6550030195561151, R-squared: 0.39979111374310106
Epoch 60 - Training Loss: 0.40428096055984497, Testing Loss: 0.428977906703949
Epoch 60 - RMSE: 0.6549640423401506, R-squared: 0.39986254478881655
Epoch 61 - Training Loss: 0.39999282360076904, Testing Loss: 0.42277559638023376
Epoch 61 - RMSE: 0.6502119898077284, R-squared: 0.4085394757054809
Epoch 62 - Training Loss: 0.3971674144268036, Testing Loss: 0.4299620985984802
Epoch 62 - RMSE: 0.6557149469019641, R-squared: 0.3984856622351267
Epoch 63 - Training Loss: 0.40801098942756653, Testing Loss: 0.42943593859672546
Epoch 63 - RMSE: 0.6553136224239811, R-squared: 0.3992217398696015
Epoch 64 - Training Loss: 0.42493757605552673, Testing Loss: 0.4528244137763977
Epoch 64 - RMSE: 0.6729223281524153, R-squared: 0.36650134897197584
Epoch 65 - Training Loss: 0.3977113664150238, Testing Loss: 0.4248279631137848
Epoch 65 - RMSE: 0.6517882967226359, R-squared: 0.4056682477268049
Epoch 66 - Training Loss: 0.39777809381484985, Testing Loss: 0.41775617003440857

Epoch 66 - RMSE: 0.6463405891128083, R-squared: 0.415616899237826
Epoch 67 - Training Loss: 0.3945314884185791, Testing Loss: 0.4266737699508667
Epoch 67 - RMSE: 0.6532026873819654, R-squared: 0.40308603089529205
Epoch 68 - Training Loss: 0.3954065442085266, Testing Loss: 0.425381600856781
Epoch 68 - RMSE: 0.6522128444696919, R-squared: 0.4048937496764774
Epoch 69 - Training Loss: 0.39120781421661377, Testing Loss: 0.4281116724014282
Epoch 69 - RMSE: 0.6543024138586805, R-squared: 0.4010744204135973
Epoch 70 - Training Loss: 0.38718658685684204, Testing Loss: 0.4237094819545746
Epoch 70 - RMSE: 0.6509297308180663, R-squared: 0.4072329794146894
Epoch 71 - Training Loss: 0.38741999864578247, Testing Loss: 0.4302339553833008
Epoch 71 - RMSE: 0.6559222056633915, R-squared: 0.39810534813687837
Epoch 72 - Training Loss: 0.4049888551235199, Testing Loss: 0.4413149356842041
Epoch 72 - RMSE: 0.6643153840034927, R-squared: 0.3826031115068913
Epoch 73 - Training Loss: 0.3962673544883728, Testing Loss: 0.4419872462749481
Epoch 73 - RMSE: 0.664821226619765, R-squared: 0.38166252043412696
Epoch 74 - Training Loss: 0.3998435139656067, Testing Loss: 0.4285230338573456
Epoch 74 - RMSE: 0.65461671806274, R-squared: 0.4004988760269641
Epoch 75 - Training Loss: 0.3978857100009918, Testing Loss: 0.43336543440818787
Epoch 75 - RMSE: 0.6583049784751557, R-squared: 0.39372439206067344
Epoch 76 - Training Loss: 0.39049002528190613, Testing Loss: 0.4358103573322296
Epoch 76 - RMSE: 0.6601593480187405, R-squared: 0.3903039637987358
Epoch 77 - Training Loss: 0.40274760127067566, Testing Loss: 0.43483877182006836
Epoch 77 - RMSE: 0.6594230553919366, R-squared: 0.3916632245722589
Epoch 78 - Training Loss: 0.4127734303474426, Testing Loss: 0.44935378432273865
Epoch 78 - RMSE: 0.6703385354105131, R-squared: 0.371356847785429
Epoch 79 - Training Loss: 0.408926397562027, Testing Loss: 0.44430217146873474
Epoch 79 - RMSE: 0.6665599650941593, R-squared: 0.3784239563260582
Epoch 80 - Training Loss: 0.39285513758659363, Testing Loss: 0.441290944814682
Epoch 80 - RMSE: 0.6642973286703169, R-squared: 0.38263667133496804
Epoch 81 - Training Loss: 0.4310131371021271, Testing Loss: 0.462364137172699
Epoch 81 - RMSE: 0.6799736526923484, R-squared: 0.35315535491552397
Epoch 82 - Training Loss: 0.39821764826774597, Testing Loss: 0.44432538747787476
Epoch 82 - RMSE: 0.6665773407556275, R-squared: 0.37839154983227985
Epoch 83 - Training Loss: 0.38612228631973267, Testing Loss: 0.42193078994750977
Epoch 83 - RMSE: 0.6495619879774083, R-squared: 0.4097214233357789
Epoch 84 - Training Loss: 0.3974393308162689, Testing Loss: 0.45578011870384216
Epoch 84 - RMSE: 0.6751149085290912, R-squared: 0.3623663707310767
Epoch 85 - Training Loss: 0.39260345697402954, Testing Loss: 0.4524989128112793
Epoch 85 - RMSE: 0.6726804251908501, R-squared: 0.3669567288844353
Epoch 86 - Training Loss: 0.38148239254951477, Testing Loss: 0.4277198612689972
Epoch 86 - RMSE: 0.6540029635855594, R-squared: 0.4016225076099209
Epoch 87 - Training Loss: 0.3995164632797241, Testing Loss: 0.4386516809463501
Epoch 87 - RMSE: 0.6623078514312524, R-squared: 0.38632896708579423
Epoch 88 - Training Loss: 0.37287119030952454, Testing Loss: 0.42536357045173645
Epoch 88 - RMSE: 0.6521990523809185, R-squared: 0.40491891836648575
Epoch 89 - Training Loss: 0.36984753608703613, Testing Loss: 0.4174516797065735
Epoch 89 - RMSE: 0.6461050143263212, R-squared: 0.4159876382308735
Epoch 90 - Training Loss: 0.39495089650154114, Testing Loss: 0.4440980851650238
Epoch 90 - RMSE: 0.6664068538192235, R-squared: 0.3787094801349147
Epoch 91 - Training Loss: 0.38169097900390625, Testing Loss: 0.4417535364627838
Epoch 91 - RMSE: 0.6646454091004877, R-squared: 0.38198952619791615
Epoch 92 - Training Loss: 0.3890358507633209, Testing Loss: 0.4492124915122986
Epoch 92 - RMSE: 0.6702331573368034, R-squared: 0.37155447926271024
Epoch 93 - Training Loss: 0.36860164999961853, Testing Loss: 0.4196959435939789
Epoch 93 - RMSE: 0.6478394666723479, R-squared: 0.41284789717831694
Epoch 94 - Training Loss: 0.37776219844818115, Testing Loss: 0.446494460105896
Epoch 94 - RMSE: 0.6682024068368957, R-squared: 0.3753569847860888
Epoch 95 - Training Loss: 0.3914889097213745, Testing Loss: 0.45909109711647034
Epoch 95 - RMSE: 0.6775626272377785, R-squared: 0.3577343381897018
Epoch 96 - Training Loss: 0.37351444363594055, Testing Loss: 0.4331543445587158
Epoch 96 - RMSE: 0.6581445610192428, R-squared: 0.39401983366857796
Epoch 97 - Training Loss: 0.3815024197101593, Testing Loss: 0.43287795782089233
Epoch 97 - RMSE: 0.657934625633791, R-squared: 0.39440636391587736
Epoch 98 - Training Loss: 0.3731902837753296, Testing Loss: 0.4446406066417694
Epoch 98 - RMSE: 0.6668137443374056, R-squared: 0.37795056117784953
Epoch 99 - Training Loss: 0.37282100319862366, Testing Loss: 0.43596553802490234
Epoch 99 - RMSE: 0.6602768668796767, R-squared: 0.39008687329961267
Epoch 100 - Training Loss: 0.39401352405548096, Testing Loss: 0.4528754949569702
Epoch 100 - RMSE: 0.6729602605871013, R-squared: 0.36642992669191576
Epoch 101 - Training Loss: 0.3794444799423218, Testing Loss: 0.43678200244903564
Epoch 101 - RMSE: 0.6608948366016951, R-squared: 0.38894467298019453
Epoch 102 - Training Loss: 0.36654263734817505, Testing Loss: 0.43551498651504517

Epoch 102 - RMSE: 0.6599355803317942, R-squared: 0.39071721902252476
Epoch 103 - Training Loss: 0.3710065484046936, Testing Loss: 0.4435942769050598
Epoch 103 - RMSE: 0.6660287404370594, R-squared: 0.3794143096640544
Epoch 104 - Training Loss: 0.37020066380500793, Testing Loss: 0.44202449917793274
Epoch 104 - RMSE: 0.6648492356505419, R-squared: 0.3816104180113129
Epoch 105 - Training Loss: 0.36819833517074585, Testing Loss: 0.43637198209762573
Epoch 105 - RMSE: 0.6605845834807716, R-squared: 0.38951825084082414
Epoch 106 - Training Loss: 0.36878007650375366, Testing Loss: 0.43879008293151855
Epoch 106 - RMSE: 0.6624123564941661, R-squared: 0.386135290415909
Epoch 107 - Training Loss: 0.35946643352508545, Testing Loss: 0.42797648906707764
Epoch 107 - RMSE: 0.6541991116952085, R-squared: 0.40126352387014896
Epoch 108 - Training Loss: 0.3710595369338989, Testing Loss: 0.43153536319732666
Epoch 108 - RMSE: 0.6569135316747285, R-squared: 0.39628463003983283
Epoch 109 - Training Loss: 0.3783303201198578, Testing Loss: 0.44010797142982483
Epoch 109 - RMSE: 0.6634063328173434, R-squared: 0.38429165096383944
Epoch 110 - Training Loss: 0.3676287531852722, Testing Loss: 0.4294684827327728
Epoch 110 - RMSE: 0.6553384760692478, R-squared: 0.3991761683679588
Epoch 111 - Training Loss: 0.3549545407295227, Testing Loss: 0.4238079786300659
Epoch 111 - RMSE: 0.6510053887042532, R-squared: 0.4070951761957581
Epoch 112 - Training Loss: 0.3751596212387085, Testing Loss: 0.4356483221054077
Epoch 112 - RMSE: 0.6600366023895029, R-squared: 0.39053066835555716
Epoch 113 - Training Loss: 0.3627817630767822, Testing Loss: 0.4300766587257385
Epoch 113 - RMSE: 0.6558022989333279, R-squared: 0.39832538832532405
Epoch 114 - Training Loss: 0.35880401730537415, Testing Loss: 0.4299837648868561
Epoch 114 - RMSE: 0.6557314692561774, R-squared: 0.39845534858065956
Epoch 115 - Training Loss: 0.36996832489967346, Testing Loss: 0.4305717647075653
Epoch 115 - RMSE: 0.656179625527187, R-squared: 0.3976328224581568
Epoch 116 - Training Loss: 0.37506765127182007, Testing Loss: 0.45365315675735474
Epoch 116 - RMSE: 0.6735377815253388, R-squared: 0.36534202593874554
Epoch 117 - Training Loss: 0.35502010583877563, Testing Loss: 0.42664963006973267
Epoch 117 - RMSE: 0.6531842240510792, R-squared: 0.40311977498292606
Epoch 118 - Training Loss: 0.35970669984817505, Testing Loss: 0.4308566451072693
Epoch 118 - RMSE: 0.6563967051558223, R-squared: 0.3972342021181583
Epoch 119 - Training Loss: 0.39117658138275146, Testing Loss: 0.4585913121700287
Epoch 119 - RMSE: 0.6771937309355305, R-squared: 0.35843350582538347
Epoch 120 - Training Loss: 0.356219619512558, Testing Loss: 0.4355182349681854
Epoch 120 - RMSE: 0.6599380519607333, R-squared: 0.3907126551716933
Epoch 121 - Training Loss: 0.3721047341823578, Testing Loss: 0.44812560081481934
Epoch 121 - RMSE: 0.6694218261746563, R-squared: 0.37307505108310957
Epoch 122 - Training Loss: 0.35059383511543274, Testing Loss: 0.4216095805168152
Epoch 122 - RMSE: 0.6493147191104942, R-squared: 0.41017074068094683
Epoch 123 - Training Loss: 0.35373643040657043, Testing Loss: 0.4313383102416992
Epoch 123 - RMSE: 0.6567634898617632, R-squared: 0.39656038080318035
Epoch 124 - Training Loss: 0.3730551302433014, Testing Loss: 0.46077626943588257
Epoch 124 - RMSE: 0.6788050181190184, R-squared: 0.35537683931791697
Epoch 125 - Training Loss: 0.3698488175868988, Testing Loss: 0.43980783224105835
Epoch 125 - RMSE: 0.6631800949258266, R-squared: 0.3847115227679142
Epoch 126 - Training Loss: 0.3558492064476013, Testing Loss: 0.4382758140563965
Epoch 126 - RMSE: 0.6620240132504183, R-squared: 0.38685484321819297
Epoch 127 - Training Loss: 0.3764644265174866, Testing Loss: 0.45483577251434326
Epoch 127 - RMSE: 0.6744151102242387, R-squared: 0.36368757890638015
Epoch 128 - Training Loss: 0.3674631416797638, Testing Loss: 0.4401325285434723
Epoch 128 - RMSE: 0.6634248188051303, R-squared: 0.3842573367433131
Epoch 129 - Training Loss: 0.35307708382606506, Testing Loss: 0.4333328902721405
Epoch 129 - RMSE: 0.6582802485923138, R-squared: 0.39376994190042425
Epoch 130 - Training Loss: 0.36703813076019287, Testing Loss: 0.4462414085865021
Epoch 130 - RMSE: 0.6680130288519768, R-squared: 0.37571099989068135
Epoch 131 - Training Loss: 0.34649091958999634, Testing Loss: 0.4290224611759186
Epoch 131 - RMSE: 0.6549980809750174, R-squared: 0.399800164599348
Epoch 132 - Training Loss: 0.3673765957355499, Testing Loss: 0.4434749186038971
Epoch 132 - RMSE: 0.6659391492052588, R-squared: 0.3795812553034593
Epoch 133 - Training Loss: 0.34956592321395874, Testing Loss: 0.43138980865478516
Epoch 133 - RMSE: 0.6568027138228063, R-squared: 0.39648830006397195
Epoch 134 - Training Loss: 0.3765241205692291, Testing Loss: 0.44200295209884644
Epoch 134 - RMSE: 0.664833038138023, R-squared: 0.38164054890549426
Epoch 135 - Training Loss: 0.3561115562915802, Testing Loss: 0.4320591986179352
Epoch 135 - RMSE: 0.657312077921701, R-squared: 0.3955518654632655
Epoch 136 - Training Loss: 0.36601772904396057, Testing Loss: 0.44839271903038025
Epoch 136 - RMSE: 0.669621305110939, R-squared: 0.3727013645676138
Epoch 137 - Training Loss: 0.35310468077659607, Testing Loss: 0.43561866879463196
Epoch 137 - RMSE: 0.6600141565740315, R-squared: 0.3905721200068628
Epoch 138 - Training Loss: 0.3521687984466553, Testing Loss: 0.4439716041088104

Epoch 138 - RMSE: 0.6663119028248256, R-squared: 0.3768865129780573
Epoch 139 - Training Loss: 0.3530806303024292, Testing Loss: 0.43710407614707947
Epoch 139 - RMSE: 0.661138462013314, R-squared: 0.3884940837608222
Epoch 140 - Training Loss: 0.34572601318359375, Testing Loss: 0.43401363492012024
Epoch 140 - RMSE: 0.6587970854386992, R-squared: 0.3928176270416719
Epoch 141 - Training Loss: 0.35949647426605225, Testing Loss: 0.4481004476547241
Epoch 141 - RMSE: 0.6694030695292391, R-squared: 0.37311018242711835
Epoch 142 - Training Loss: 0.3550821542739868, Testing Loss: 0.4414708614349365
Epoch 142 - RMSE: 0.6644327072266554, R-squared: 0.3823850181405105
Epoch 143 - Training Loss: 0.3696049749851227, Testing Loss: 0.45873934030532837
Epoch 143 - RMSE: 0.6773030045757337, R-squared: 0.3582264396364607
Epoch 144 - Training Loss: 0.35781654715538025, Testing Loss: 0.44303879141807556
Epoch 144 - RMSE: 0.6656116047004027, R-squared: 0.38019141548050783
Epoch 145 - Training Loss: 0.34781643748283386, Testing Loss: 0.43617770075798035
Epoch 145 - RMSE: 0.6604375091234926, R-squared: 0.38979005922996746
Epoch 146 - Training Loss: 0.3432058095932007, Testing Loss: 0.4295370578765869
Epoch 146 - RMSE: 0.6553907973262377, R-squared: 0.3990802267617667
Epoch 147 - Training Loss: 0.35729020833969116, Testing Loss: 0.44799676537513733
Epoch 147 - RMSE: 0.6693255983634985, R-squared: 0.3732552760989649
Epoch 148 - Training Loss: 0.3679422438144684, Testing Loss: 0.4470098316669464
Epoch 148 - RMSE: 0.6685879459202199, R-squared: 0.37463596442350067
Epoch 149 - Training Loss: 0.3608562648296356, Testing Loss: 0.4535384476184845
Epoch 149 - RMSE: 0.6734526209488263, R-squared: 0.36550250519796224
Epoch 150 - Training Loss: 0.35228079557418823, Testing Loss: 0.4472973644733429
Epoch 150 - RMSE: 0.6688029446785512, R-squared: 0.3742337013853704
Epoch 151 - Training Loss: 0.353730171918869, Testing Loss: 0.44586238265037537
Epoch 151 - RMSE: 0.6677292432047891, R-squared: 0.3762413087881763
Epoch 152 - Training Loss: 0.3486119508743286, Testing Loss: 0.4340030252933502
Epoch 152 - RMSE: 0.658789027199916, R-squared: 0.39283248075226185
Epoch 153 - Training Loss: 0.3551751971244812, Testing Loss: 0.4465922713279724
Epoch 153 - RMSE: 0.6682755965351831, R-squared: 0.3752201402098969
Epoch 154 - Training Loss: 0.3692111074924469, Testing Loss: 0.4549846947193146
Epoch 154 - RMSE: 0.6745255526848644, R-squared: 0.3634791563409576
Epoch 155 - Training Loss: 0.3438292145729065, Testing Loss: 0.4461308419704437
Epoch 155 - RMSE: 0.6679302688886214, R-squared: 0.3758656763179027
Epoch 156 - Training Loss: 0.35491207242012024, Testing Loss: 0.45720693469047546
Epoch 156 - RMSE: 0.6761708248140981, R-squared: 0.36037022384188155
Epoch 157 - Training Loss: 0.36864209175109863, Testing Loss: 0.4463310241699219
Epoch 157 - RMSE: 0.6680801131904134, R-squared: 0.37558560677518904
Epoch 158 - Training Loss: 0.3524037301540375, Testing Loss: 0.4326598048210144
Epoch 158 - RMSE: 0.6577688014324683, R-squared: 0.3947115900646536
Epoch 159 - Training Loss: 0.34071987867355347, Testing Loss: 0.43775874376296997
Epoch 159 - RMSE: 0.6616334124552594, R-squared: 0.38757815333617995
Epoch 160 - Training Loss: 0.35972410440444946, Testing Loss: 0.44832494854927063
Epoch 160 - RMSE: 0.6695707415985179, R-squared: 0.3727960963945842
Epoch 161 - Training Loss: 0.34793272614479065, Testing Loss: 0.4503083825111389
Epoch 161 - RMSE: 0.6710502094443661, R-squared: 0.37002132409803545
Epoch 162 - Training Loss: 0.3381379246711731, Testing Loss: 0.4370894730091095
Epoch 162 - RMSE: 0.6611274197719857, R-squared: 0.38851451016134186
Epoch 163 - Training Loss: 0.34602388739585876, Testing Loss: 0.4393068850040436
Epoch 163 - RMSE: 0.662802298739015, R-squared: 0.3854123502834421
Epoch 164 - Training Loss: 0.339192271232605, Testing Loss: 0.43629592657089233
Epoch 164 - RMSE: 0.6605269942983767, R-squared: 0.38962468872386213
Epoch 165 - Training Loss: 0.35621657967567444, Testing Loss: 0.4581882953643799
Epoch 165 - RMSE: 0.6768960715310346, R-squared: 0.3589973808938476
Epoch 166 - Training Loss: 0.34819504618644714, Testing Loss: 0.43547025322914124
Epoch 166 - RMSE: 0.6599017379248775, R-squared: 0.3907797071432296
Epoch 167 - Training Loss: 0.3573784828186035, Testing Loss: 0.4525619149208069
Epoch 167 - RMSE: 0.6727272432524407, R-squared: 0.3668686071281504
Epoch 168 - Training Loss: 0.35693231225013733, Testing Loss: 0.4628947973251343
Epoch 168 - RMSE: 0.6803637390209566, R-squared: 0.35241298018209266
Epoch 169 - Training Loss: 0.3494875133037567, Testing Loss: 0.4443502128124237
Epoch 169 - RMSE: 0.6665959697253003, R-squared: 0.3783568049165087
Epoch 170 - Training Loss: 0.35097745060920715, Testing Loss: 0.46447932720184326
Epoch 170 - RMSE: 0.6815272184179274, R-squared: 0.35019622950259044
Epoch 171 - Training Loss: 0.3778306245803833, Testing Loss: 0.46549683809280396
Epoch 171 - RMSE: 0.6822732785462451, R-squared: 0.34877278515636023
Epoch 172 - Training Loss: 0.35866811871528625, Testing Loss: 0.4646058678627014
Epoch 172 - RMSE: 0.6816200131967325, R-squared: 0.35001926664462024
Epoch 173 - Training Loss: 0.34081408381462097, Testing Loss: 0.44065749645233154
Epoch 173 - RMSE: 0.6638203964814112, R-squared: 0.3835228249720405
Epoch 174 - Training Loss: 0.33198437094688416, Testing Loss: 0.441977858543396

Epoch 174 - RMSE: 0.6648141876093161, R-squared: 0.3816756140621991
Epoch 175 - Training Loss: 0.3413272798061371, Testing Loss: 0.4471026062965393
Epoch 175 - RMSE: 0.6686573243704054, R-squared: 0.37450617136052833
Epoch 176 - Training Loss: 0.33212313055992126, Testing Loss: 0.4391612410545349
Epoch 176 - RMSE: 0.6626924151027149, R-squared: 0.3856161139935742
Epoch 177 - Training Loss: 0.32903775572776794, Testing Loss: 0.4359677731990814
Epoch 177 - RMSE: 0.660278530889566, R-squared: 0.3900837991263252
Epoch 178 - Training Loss: 0.3373076021671295, Testing Loss: 0.43480566143989563
Epoch 178 - RMSE: 0.6593979819162706, R-squared: 0.3917094857007509
Epoch 179 - Training Loss: 0.36596623063087463, Testing Loss: 0.4651649296283722
Epoch 179 - RMSE: 0.6820300157830115, R-squared: 0.34923708910832774
Epoch 180 - Training Loss: 0.36032822728157043, Testing Loss: 0.462056964635849
Epoch 180 - RMSE: 0.679747726636888, R-squared: 0.3535851209239952
Epoch 181 - Training Loss: 0.35775265097618103, Testing Loss: 0.46128085255622864
Epoch 181 - RMSE: 0.679176573229612, R-squared: 0.35467095596683673
Epoch 182 - Training Loss: 0.3362937569618225, Testing Loss: 0.4436599612236023
Epoch 182 - RMSE: 0.666078052594835, R-squared: 0.37932241107018116
Epoch 183 - Training Loss: 0.337119996547699, Testing Loss: 0.4457908868789673
Epoch 183 - RMSE: 0.6676757316928753, R-squared: 0.37634128024671654
Epoch 184 - Training Loss: 0.34631288051605225, Testing Loss: 0.43770912289619446
Epoch 184 - RMSE: 0.6615958649771215, R-squared: 0.38764766083985047
Epoch 185 - Training Loss: 0.3525785803794861, Testing Loss: 0.4590621590614319
Epoch 185 - RMSE: 0.6775412679506366, R-squared: 0.3577748307431987
Epoch 186 - Training Loss: 0.35025548934936523, Testing Loss: 0.45024892687797546
Epoch 186 - RMSE: 0.671005934715199, R-squared: 0.37010445115686574
Epoch 187 - Training Loss: 0.3396337032318115, Testing Loss: 0.4480772018432617
Epoch 187 - RMSE: 0.669385695762747, R-squared: 0.3731427227498738
Epoch 188 - Training Loss: 0.3330160677433014, Testing Loss: 0.4396764636039734
Epoch 188 - RMSE: 0.6630810306321313, R-squared: 0.3848953297499541
Epoch 189 - Training Loss: 0.35516420006752014, Testing Loss: 0.4478377103805542
Epoch 189 - RMSE: 0.6692067656188014, R-squared: 0.37347780212969184
Epoch 190 - Training Loss: 0.33961549401283264, Testing Loss: 0.4544157385826111
Epoch 190 - RMSE: 0.6741036674714384, R-squared: 0.36427513731305095
Epoch 191 - Training Loss: 0.33690106868743896, Testing Loss: 0.4391539990901947
Epoch 191 - RMSE: 0.6626869630689248, R-squared: 0.3856262231418046
Epoch 192 - Training Loss: 0.33446696400642395, Testing Loss: 0.4494967460632324
Epoch 192 - RMSE: 0.6704452171888073, R-squared: 0.3711567396239651
Epoch 193 - Training Loss: 0.3494512140750885, Testing Loss: 0.44934141635894775
Epoch 193 - RMSE: 0.6703293490212885, R-squared: 0.37137407765005503
Epoch 194 - Training Loss: 0.32489776611328125, Testing Loss: 0.4395211935043335
Epoch 194 - RMSE: 0.662963960629252, R-squared: 0.3851125096881992
Epoch 195 - Training Loss: 0.33056095242500305, Testing Loss: 0.4371448755264282
Epoch 195 - RMSE: 0.6611693179949788, R-squared: 0.38843700326488395
Epoch 196 - Training Loss: 0.3347645699977875, Testing Loss: 0.4446501135826111
Epoch 196 - RMSE: 0.666820933738596, R-squared: 0.3779371475758575
Epoch 197 - Training Loss: 0.36369842290878296, Testing Loss: 0.4727253019809723
Epoch 197 - RMSE: 0.6875502171018213, R-squared: 0.33866019363272026
Epoch 198 - Training Loss: 0.326857328414917, Testing Loss: 0.4465305805206299
Epoch 198 - RMSE: 0.6682294520943125, R-squared: 0.3753064193500797
Epoch 199 - Training Loss: 0.3364514410495758, Testing Loss: 0.441012442111969
Epoch 199 - RMSE: 0.6640876778662552, R-squared: 0.38302628691413676
Epoch 200 - Training Loss: 0.33231842517852783, Testing Loss: 0.4406526982784271
Epoch 200 - RMSE: 0.6638167251054883, R-squared: 0.3835296440249367
Epoch 201 - Training Loss: 0.336288183927536, Testing Loss: 0.462134450674057
Epoch 201 - RMSE: 0.6798047275492927, R-squared: 0.3534767048709684
Epoch 202 - Training Loss: 0.3348747193813324, Testing Loss: 0.44501033425331116
Epoch 202 - RMSE: 0.6670909253179581, R-squared: 0.3774333069650241
Epoch 203 - Training Loss: 0.32867538928985596, Testing Loss: 0.4456408619880676
Epoch 203 - RMSE: 0.6675634308430879, R-squared: 0.3765510572712557
Epoch 204 - Training Loss: 0.32872411608695984, Testing Loss: 0.4487042725086212
Epoch 204 - RMSE: 0.6698539035464535, R-squared: 0.3722654942589039
Epoch 205 - Training Loss: 0.33368709683418274, Testing Loss: 0.44444093108177185
Epoch 205 - RMSE: 0.6666640051777105, R-squared: 0.3782299036561583
Epoch 206 - Training Loss: 0.33089548349380493, Testing Loss: 0.4493101239204407
Epoch 206 - RMSE: 0.670305988792007, R-squared: 0.37141789070948483
Epoch 207 - Training Loss: 0.33540472388267517, Testing Loss: 0.4502420723438263
Epoch 207 - RMSE: 0.6710007923926801, R-squared: 0.3701141056576268
Epoch 208 - Training Loss: 0.3194235861301422, Testing Loss: 0.4443010985851288
Epoch 208 - RMSE: 0.6665591405036669, R-squared: 0.3784254942083365
Epoch 209 - Training Loss: 0.3400038182735443, Testing Loss: 0.470072478055954
Epoch 209 - RMSE: 0.6856183162255626, R-squared: 0.3423714802803308
Epoch 210 - Training Loss: 0.32054683566093445, Testing Loss: 0.4372718334197998

Epoch 210 - RMSE: 0.6612653341073232, R-squared: 0.38825936596834576
Epoch 211 - Training Loss: 0.3261061906814575, Testing Loss: 0.4478452801704407
Epoch 211 - RMSE: 0.6692124384028053, R-squared: 0.37346718018039704
Epoch 212 - Training Loss: 0.32988592982292175, Testing Loss: 0.45011740922927856
Epoch 212 - RMSE: 0.6709079284752032, R-squared: 0.37028844114195425
Epoch 213 - Training Loss: 0.33994919061660767, Testing Loss: 0.4560021460056305
Epoch 213 - RMSE: 0.6752793092694429, R-squared: 0.3620557859611718
Epoch 214 - Training Loss: 0.34748679399490356, Testing Loss: 0.46333059668540955
Epoch 214 - RMSE: 0.6806839035727653, R-squared: 0.3518033557132355
Epoch 215 - Training Loss: 0.3276492953300476, Testing Loss: 0.4486812651157379
Epoch 215 - RMSE: 0.6698367433601926, R-squared: 0.3722976562064745
Epoch 216 - Training Loss: 0.3352063298225403, Testing Loss: 0.45553016662597656
Epoch 216 - RMSE: 0.6749297768019357, R-squared: 0.3627160298131714
Epoch 217 - Training Loss: 0.35922548174858093, Testing Loss: 0.47502192854881287
Epoch 217 - RMSE: 0.6892183696292754, R-squared: 0.3354471803355207
Epoch 218 - Training Loss: 0.32803812623023987, Testing Loss: 0.46324148774147034
Epoch 218 - RMSE: 0.6806184316094677, R-squared: 0.35192804403239875
Epoch 219 - Training Loss: 0.34770119190216064, Testing Loss: 0.4725395441055298
Epoch 219 - RMSE: 0.6874151228852906, R-squared: 0.33892005655886837
Epoch 220 - Training Loss: 0.327101469039917, Testing Loss: 0.4497717320919037
Epoch 220 - RMSE: 0.6706502314687369, R-squared: 0.37077209504360875
Epoch 221 - Training Loss: 0.32969290018081665, Testing Loss: 0.4566193222999573
Epoch 221 - RMSE: 0.6757361244625186, R-squared: 0.36119237677159943
Epoch 222 - Training Loss: 0.3289831280708313, Testing Loss: 0.4622420072555542
Epoch 222 - RMSE: 0.679883853114152, R-squared: 0.35332619253700337
Epoch 223 - Training Loss: 0.34123238921165466, Testing Loss: 0.46779653429985046
Epoch 223 - RMSE: 0.6839564746046057, R-squared: 0.34555561329716855
Epoch 224 - Training Loss: 0.3201071321964264, Testing Loss: 0.447648823261261
Epoch 224 - RMSE: 0.6690656295335663, R-squared: 0.37374204203410744
Epoch 225 - Training Loss: 0.33205515146255493, Testing Loss: 0.46681803464889526
Epoch 225 - RMSE: 0.6832408468402964, R-squared: 0.3469243950193138
Epoch 226 - Training Loss: 0.31915542483329773, Testing Loss: 0.4504941999912262
Epoch 226 - RMSE: 0.6711886171320957, R-squared: 0.36976142436854864
Epoch 227 - Training Loss: 0.32086265087127686, Testing Loss: 0.4437461495399475
Epoch 227 - RMSE: 0.6661427574326639, R-squared: 0.37920181621421134
Epoch 228 - Training Loss: 0.34866347908973694, Testing Loss: 0.47582852840423584
Epoch 228 - RMSE: 0.6898032710694427, R-squared: 0.3343187634168495
Epoch 229 - Training Loss: 0.317482590675354, Testing Loss: 0.45563071966171265
Epoch 229 - RMSE: 0.6750042312959306, R-squared: 0.3625754188213378
Epoch 230 - Training Loss: 0.31796178221702576, Testing Loss: 0.45483699440956116
Epoch 230 - RMSE: 0.6744160127219322, R-squared: 0.36368587588737034
Epoch 231 - Training Loss: 0.32328373193740845, Testing Loss: 0.457888662815094
Epoch 231 - RMSE: 0.6766746838707323, R-squared: 0.3594166088057602
Epoch 232 - Training Loss: 0.31918278336524963, Testing Loss: 0.45069989562034607
Epoch 232 - RMSE: 0.6713418462401809, R-squared: 0.36947363069716255
Epoch 233 - Training Loss: 0.32739555835723877, Testing Loss: 0.4672408401966095
Epoch 233 - RMSE: 0.6835501745684913, R-squared: 0.34633291948398304
Epoch 234 - Training Loss: 0.3301253914833069, Testing Loss: 0.4706777334213257
Epoch 234 - RMSE: 0.6860595506149183, R-squared: 0.3415247651872183
Epoch 235 - Training Loss: 0.3404376208782196, Testing Loss: 0.4647851586341858
Epoch 235 - RMSE: 0.6817515621347794, R-squared: 0.34976835697501796
Epoch 236 - Training Loss: 0.3213699162006378, Testing Loss: 0.44581806659698486
Epoch 236 - RMSE: 0.6676960905479354, R-squared: 0.37630324630161804
Epoch 237 - Training Loss: 0.3249277174472809, Testing Loss: 0.45164161920547485
Epoch 237 - RMSE: 0.6720428372758894, R-squared: 0.36815619728551174
Epoch 238 - Training Loss: 0.35013845562934875, Testing Loss: 0.47949349880218506
Epoch 238 - RMSE: 0.6924547064703078, R-squared: 0.3291914959599478
Epoch 239 - Training Loss: 0.3173728883266449, Testing Loss: 0.4470047354698181
Epoch 239 - RMSE: 0.668584126912374, R-squared: 0.3746431086245051
Epoch 240 - Training Loss: 0.32986488938331604, Testing Loss: 0.4629477560520172
Epoch 240 - RMSE: 0.6804026567654893, R-squared: 0.35233889232124116
Epoch 241 - Training Loss: 0.3238908052444458, Testing Loss: 0.4591849446296692
Epoch 241 - RMSE: 0.6776318846040478, R-squared: 0.3576030325369143
Epoch 242 - Training Loss: 0.32735106348991394, Testing Loss: 0.4568800628185272
Epoch 242 - RMSE: 0.6759290513607549, R-squared: 0.36082755754052354
Epoch 243 - Training Loss: 0.32483822107315063, Testing Loss: 0.4538988769054413
Epoch 243 - RMSE: 0.6737201649537613, R-squared: 0.36499826862579954
Epoch 244 - Training Loss: 0.3148259222507477, Testing Loss: 0.4485580623149872
Epoch 244 - RMSE: 0.6697447537415182, R-squared: 0.3724700508531321
Epoch 245 - Training Loss: 0.3704690933227539, Testing Loss: 0.4958696961402893
Epoch 245 - RMSE: 0.7041801715176473, R-squared: 0.30628130143748744
Epoch 246 - Training Loss: 0.322471022605896, Testing Loss: 0.46230754256248474

Epoch 246 - RMSE: 0.679932001323918, R-squared: 0.3532345966313354
Epoch 247 - Training Loss: 0.30860427021980286, Testing Loss: 0.44834890961647034
Epoch 247 - RMSE: 0.6695886201909929, R-squared: 0.37276260128494465
Epoch 248 - Training Loss: 0.3248573839664459, Testing Loss: 0.453245609998703
Epoch 248 - RMSE: 0.673235234411057, R-squared: 0.3659120631910172
Epoch 249 - Training Loss: 0.3150925636291504, Testing Loss: 0.44429782032966614
Epoch 249 - RMSE: 0.6665566759771773, R-squared: 0.37843009060169364
Epoch 250 - Training Loss: 0.34604713320732117, Testing Loss: 0.48454180359840393
Epoch 250 - RMSE: 0.6960903812212413, R-squared: 0.3221289574764601
Epoch 251 - Training Loss: 0.3189607858657837, Testing Loss: 0.4553348422050476
Epoch 251 - RMSE: 0.6747850169971599, R-squared: 0.36298937146440535
Epoch 252 - Training Loss: 0.3105452060699463, Testing Loss: 0.44843241572380066
Epoch 252 - RMSE: 0.669650979635413, R-squared: 0.37264576537736016
Epoch 253 - Training Loss: 0.3292512893676758, Testing Loss: 0.47374337911605835
Epoch 253 - RMSE: 0.6882901708636695, R-squared: 0.33723593633532123
Epoch 254 - Training Loss: 0.3108752965927124, Testing Loss: 0.4503234028816223
Epoch 254 - RMSE: 0.671061421871195, R-squared: 0.37000027157850757
Epoch 255 - Training Loss: 0.3160080015659332, Testing Loss: 0.4545444846153259
Epoch 255 - RMSE: 0.6741991734886711, R-squared: 0.36409498742315705
Epoch 256 - Training Loss: 0.33710387349128723, Testing Loss: 0.479973703622818
Epoch 256 - RMSE: 0.6928013287629332, R-squared: 0.32851975418387813
Epoch 257 - Training Loss: 0.32293573021888733, Testing Loss: 0.4665849804878235
Epoch 257 - RMSE: 0.6830702646938336, R-squared: 0.3472504561212768
Epoch 258 - Training Loss: 0.30845704674720764, Testing Loss: 0.4486297070980072
Epoch 258 - RMSE: 0.6697982695169578, R-squared: 0.37236976162096425
Epoch 259 - Training Loss: 0.31801605224609375, Testing Loss: 0.4509848356246948
Epoch 259 - RMSE: 0.6715540465459839, R-squared: 0.3690749693153127
Epoch 260 - Training Loss: 0.3075084090232849, Testing Loss: 0.44536203145980835
Epoch 260 - RMSE: 0.6673545304459735, R-squared: 0.3769411875507741
Epoch 261 - Training Loss: 0.33120590448379517, Testing Loss: 0.46744099259376526
Epoch 261 - RMSE: 0.6836965651480735, R-squared: 0.34605290799983823
Epoch 262 - Training Loss: 0.38066336512565613, Testing Loss: 0.5281065702438354
Epoch 262 - RMSE: 0.7267094077079012, R-squared: 0.261182146341989
Epoch 263 - Training Loss: 0.30986353754997253, Testing Loss: 0.4518143832683563
Epoch 263 - RMSE: 0.672171364426758, R-squared: 0.36791449587956637
Epoch 264 - Training Loss: 0.3028029501438141, Testing Loss: 0.44514718651771545
Epoch 264 - RMSE: 0.6671935047700381, R-squared: 0.37724182643982085
Epoch 265 - Training Loss: 0.3328191936016083, Testing Loss: 0.48125696182250977
Epoch 265 - RMSE: 0.6937268617303214, R-squared: 0.3267244567354203
Epoch 266 - Training Loss: 0.3315916955471039, Testing Loss: 0.48084425926208496
Epoch 266 - RMSE: 0.6934293572714026, R-squared: 0.32730180075202153
Epoch 267 - Training Loss: 0.34091660380363464, Testing Loss: 0.4755713939666748
Epoch 267 - RMSE: 0.6896168705420069, R-squared: 0.33467847921912997
Epoch 268 - Training Loss: 0.32182884216308594, Testing Loss: 0.4659998416900635
Epoch 268 - RMSE: 0.6826418310366854, R-squared: 0.3480690312663115
Epoch 269 - Training Loss: 0.3316124677658081, Testing Loss: 0.4956187903881073
Epoch 269 - RMSE: 0.7040020000096324, R-squared: 0.3066323061232852
Epoch 270 - Training Loss: 0.31073230504989624, Testing Loss: 0.450069397687912
Epoch 270 - RMSE: 0.6708721093920959, R-squared: 0.3703556786497868
Epoch 271 - Training Loss: 0.30790773034095764, Testing Loss: 0.4532049894332886
Epoch 271 - RMSE: 0.6732050420964689, R-squared: 0.3659689352981246
Epoch 272 - Training Loss: 0.3349827527999878, Testing Loss: 0.47019755840301514
Epoch 272 - RMSE: 0.6857095331819074, R-squared: 0.34219648243974865
Epoch 273 - Training Loss: 0.3206939995288849, Testing Loss: 0.46803367137908936
Epoch 273 - RMSE: 0.6841298395751846, R-squared: 0.34522380238423944
Epoch 274 - Training Loss: 0.31236493587493896, Testing Loss: 0.45376506447792053
Epoch 274 - RMSE: 0.6736208537087236, R-squared: 0.36518546256140005
Epoch 275 - Training Loss: 0.32739588618278503, Testing Loss: 0.4635818600654602
Epoch 275 - RMSE: 0.6808684584350774, R-squared: 0.3514518149782515
Epoch 276 - Training Loss: 0.31640273332595825, Testing Loss: 0.46143901348114014
Epoch 276 - RMSE: 0.6792930242941736, R-squared: 0.3544496418059908
Epoch 277 - Training Loss: 0.303457111120224, Testing Loss: 0.45130765438079834
Epoch 277 - RMSE: 0.6717943459073497, R-squared: 0.3686233660292769
Epoch 278 - Training Loss: 0.3237706124782562, Testing Loss: 0.4673381745815277
Epoch 278 - RMSE: 0.6836213527622983, R-squared: 0.3461967794717431
Epoch 279 - Training Loss: 0.31035158038139343, Testing Loss: 0.4659830927848816
Epoch 279 - RMSE: 0.6826295557051265, R-squared: 0.3480924772272196
Epoch 280 - Training Loss: 0.31189024448394775, Testing Loss: 0.4554417133331299
Epoch 280 - RMSE: 0.6748642303369609, R-squared: 0.3628398047139574
Epoch 281 - Training Loss: 0.3248586654663086, Testing Loss: 0.4656400680541992
Epoch 281 - RMSE: 0.6823782155291231, R-squared: 0.3485724458595155
Epoch 282 - Training Loss: 0.3482204079627991, Testing Loss: 0.5089684128761292

Epoch 282 - RMSE: 0.7134202171820846, R-squared: 0.28795631094677676
Epoch 283 - Training Loss: 0.3192249834537506, Testing Loss: 0.4606301188468933
Epoch 283 - RMSE: 0.6786973937670253, R-squared: 0.3555812327688558
Epoch 284 - Training Loss: 0.34093761444091797, Testing Loss: 0.5048643350601196
Epoch 284 - RMSE: 0.7105380264644888, R-squared: 0.2936979486638627
Epoch 285 - Training Loss: 0.31347474455833435, Testing Loss: 0.45945829153060913
Epoch 285 - RMSE: 0.6778335019265908, R-squared: 0.3572207080699723
Epoch 286 - Training Loss: 0.2967136800289154, Testing Loss: 0.44447916746139526
Epoch 286 - RMSE: 0.6666927428847452, R-squared: 0.37817629754617266
Epoch 287 - Training Loss: 0.3155631721019745, Testing Loss: 0.460572749376297
Epoch 287 - RMSE: 0.6786551004698017, R-squared: 0.35566154468847944
Epoch 288 - Training Loss: 0.3469977080821991, Testing Loss: 0.49441489577293396
Epoch 288 - RMSE: 0.70314644426236, R-squared: 0.30831654638417616
Epoch 289 - Training Loss: 0.31435149908065796, Testing Loss: 0.4659038484096527
Epoch 289 - RMSE: 0.6825714860087029, R-squared: 0.3482033849998575
Epoch 290 - Training Loss: 0.31875181198120117, Testing Loss: 0.47544917464256287
Epoch 290 - RMSE: 0.6895282274413463, R-squared: 0.3348495085969485
Epoch 291 - Training Loss: 0.3155171871185303, Testing Loss: 0.4570317566394806
Epoch 291 - RMSE: 0.6760412424672589, R-squared: 0.36061535948626977
Epoch 292 - Training Loss: 0.30659613013267517, Testing Loss: 0.4610861539840698
Epoch 292 - RMSE: 0.6790332645177879, R-squared: 0.3549432607568028
Epoch 293 - Training Loss: 0.302947074174881, Testing Loss: 0.4476105272769928
Epoch 293 - RMSE: 0.6690370077443322, R-squared: 0.3737956219494144
Epoch 294 - Training Loss: 0.3215377926826477, Testing Loss: 0.4837822914123535
Epoch 294 - RMSE: 0.6955445970651039, R-squared: 0.3231915385522809
Epoch 295 - Training Loss: 0.3075006306171417, Testing Loss: 0.4554779529571533
Epoch 295 - RMSE: 0.6748910916774832, R-squared: 0.3627890824595731
Epoch 296 - Training Loss: 0.31965172290802, Testing Loss: 0.46250206232070923
Epoch 296 - RMSE: 0.6800751005092496, R-squared: 0.35296233016529166
Epoch 297 - Training Loss: 0.31347209215164185, Testing Loss: 0.4651232361793518
Epoch 297 - RMSE: 0.6819994226606233, R-squared: 0.34929546901068387
Epoch 298 - Training Loss: 0.307235449552536, Testing Loss: 0.4574030935764313
Epoch 298 - RMSE: 0.6763158158004529, R-squared: 0.36009588341813226
Epoch 299 - Training Loss: 0.3068064749240875, Testing Loss: 0.46301189064979553
Epoch 299 - RMSE: 0.6804497647617367, R-squared: 0.35224920697708684
Epoch 300 - Training Loss: 0.3055563271045685, Testing Loss: 0.45783188939094543
Epoch 300 - RMSE: 0.6766327431786694, R-squared: 0.3594960138102329
Epoch 301 - Training Loss: 0.32851383090019226, Testing Loss: 0.48584431409835815
Epoch 301 - RMSE: 0.697025345163846, R-squared: 0.32030674979086726
Epoch 302 - Training Loss: 0.3078652620315552, Testing Loss: 0.46722379326820374
Epoch 302 - RMSE: 0.6835377006875367, R-squared: 0.3463567763748213
Epoch 303 - Training Loss: 0.2990875244140625, Testing Loss: 0.4593377709388733
Epoch 303 - RMSE: 0.6777446295755858, R-squared: 0.35738924964182406
Epoch 304 - Training Loss: 0.3141132593154907, Testing Loss: 0.47226637601852417
Epoch 304 - RMSE: 0.687216401398524, R-squared: 0.3393022180685259
Epoch 305 - Training Loss: 0.3014238476753235, Testing Loss: 0.45523110032081604
Epoch 305 - RMSE: 0.6747081628349081, R-squared: 0.3631344669511507
Epoch 306 - Training Loss: 0.3234047293663025, Testing Loss: 0.48228415846824646
Epoch 306 - RMSE: 0.6944668097930051, R-squared: 0.3252874225008643
Epoch 307 - Training Loss: 0.3062148094177246, Testing Loss: 0.45507386326789856
Epoch 307 - RMSE: 0.67459159993799, R-squared: 0.36335449831623834
Epoch 308 - Training Loss: 0.3049625754356384, Testing Loss: 0.4596617817878723
Epoch 308 - RMSE: 0.6779836277443582, R-squared: 0.3569359524399238
Epoch 309 - Training Loss: 0.30746546387672424, Testing Loss: 0.45765793323516846
Epoch 309 - RMSE: 0.676504200184231, R-squared: 0.3597393495951
Epoch 310 - Training Loss: 0.3213920593261719, Testing Loss: 0.48545509576797485
Epoch 310 - RMSE: 0.6967460741448098, R-squared: 0.32085129412187097
Epoch 311 - Training Loss: 0.3033551573753357, Testing Loss: 0.45994749665260315
Epoch 311 - RMSE: 0.6781943041036953, R-squared: 0.35653623942012147
Epoch 312 - Training Loss: 0.29930558800697327, Testing Loss: 0.4613702893257141
Epoch 312 - RMSE: 0.679242455744599, R-squared: 0.3545457515231417
Epoch 313 - Training Loss: 0.3041524291038513, Testing Loss: 0.46736428141593933
Epoch 313 - RMSE: 0.6836404345669903, R-squared: 0.34616027996970933
Epoch 314 - Training Loss: 0.29599225521087646, Testing Loss: 0.45911046862602234
Epoch 314 - RMSE: 0.6775769062384353, R-squared: 0.3577072676044234
Epoch 315 - Training Loss: 0.2975950837135315, Testing Loss: 0.4560256600379944
Epoch 315 - RMSE: 0.6752967276756376, R-squared: 0.36202287479505024
Epoch 316 - Training Loss: 0.3285978138446808, Testing Loss: 0.4850573241710663
Epoch 316 - RMSE: 0.6964605999488899, R-squared: 0.3214077083430664
Epoch 317 - Training Loss: 0.2972714304924011, Testing Loss: 0.4640851318836212
Epoch 317 - RMSE: 0.6812379627773358, R-squared: 0.3507476954270431
Epoch 318 - Training Loss: 0.3419988453388214, Testing Loss: 0.5028426647186279

Epoch 318 - RMSE: 0.2961140110088172, R-squared: 0.2965261637195348
Epoch 319 - Training Loss: 0.30000248551368713, Testing Loss: 0.456921249628067
Epoch 319 - RMSE: 0.6759595171140869, R-squared: 0.360769938153477
Epoch 320 - Training Loss: 0.33905190229415894, Testing Loss: 0.4974510669708252
Epoch 320 - RMSE: 0.705302130811396, R-squared: 0.3040689580104262
Epoch 321 - Training Loss: 0.2939244508743286, Testing Loss: 0.46426382660865784
Epoch 321 - RMSE: 0.6813691051808951, R-squared: 0.35049770142258163
Epoch 322 - Training Loss: 0.3139272928237915, Testing Loss: 0.46769002079963684
Epoch 322 - RMSE: 0.6838786035255947, R-squared: 0.3457046268420675
Epoch 323 - Training Loss: 0.3017198443412781, Testing Loss: 0.4683428108692169
Epoch 323 - RMSE: 0.684355758630261, R-squared: 0.344791279678634
Epoch 324 - Training Loss: 0.3141253590583801, Testing Loss: 0.4687921106815338
Epoch 324 - RMSE: 0.6846839254423948, R-squared: 0.34416274895411425
Epoch 325 - Training Loss: 0.308114618062973, Testing Loss: 0.46068093180656433
Epoch 325 - RMSE: 0.6787347722518536, R-squared: 0.35551024955710864
Epoch 326 - Training Loss: 0.29213881492614746, Testing Loss: 0.46127769351005554
Epoch 326 - RMSE: 0.6791743147613745, R-squared: 0.35467524778956117
Epoch 327 - Training Loss: 0.29619646072387695, Testing Loss: 0.46717318892478943
Epoch 327 - RMSE: 0.6835006925921504, R-squared: 0.3464275535562241
Epoch 328 - Training Loss: 0.28700965642929077, Testing Loss: 0.4585048258304596
Epoch 328 - RMSE: 0.6771298785767079, R-squared: 0.3585544862798986
Epoch 329 - Training Loss: 0.3114342987537384, Testing Loss: 0.486430287361145
Epoch 329 - RMSE: 0.6974455549910069, R-squared: 0.31948698081698745
Epoch 330 - Training Loss: 0.294833779335022, Testing Loss: 0.4569809138774872
Epoch 330 - RMSE: 0.6760036701265453, R-squared: 0.36068642766520154
Epoch 331 - Training Loss: 0.3119894862174988, Testing Loss: 0.48258230090141296
Epoch 331 - RMSE: 0.694681471125012, R-squared: 0.3248702475316959
Epoch 332 - Training Loss: 0.303326815366745, Testing Loss: 0.46827852725982666
Epoch 332 - RMSE: 0.6843088056353306, R-squared: 0.3448811830833791
Epoch 333 - Training Loss: 0.3065243065357208, Testing Loss: 0.47244027256965637
Epoch 333 - RMSE: 0.6873429024025439, R-squared: 0.33905895662978836
Epoch 334 - Training Loss: 0.3002479672431946, Testing Loss: 0.461183100938797
Epoch 334 - RMSE: 0.6791046459786522, R-squared: 0.35480763407995464
Epoch 335 - Training Loss: 0.31807976961135864, Testing Loss: 0.4712797701358795
Epoch 335 - RMSE: 0.6864982037004508, R-squared: 0.3406824635728214
Epoch 336 - Training Loss: 0.3069448173046112, Testing Loss: 0.4753619432449341
Epoch 336 - RMSE: 0.6894650043926748, R-squared: 0.3349714786985327
Epoch 337 - Training Loss: 0.3106175661087036, Testing Loss: 0.4749217927455902
Epoch 337 - RMSE: 0.689145655360496, R-squared: 0.33558739692116424
Epoch 338 - Training Loss: 0.3111705183982849, Testing Loss: 0.4729868173599243
Epoch 338 - RMSE: 0.6877403630809649, R-squared: 0.33829434837372163
Epoch 339 - Training Loss: 0.2916052043437958, Testing Loss: 0.45894938707351685
Epoch 339 - RMSE: 0.6774580428978796, R-squared: 0.35793259512872766
Epoch 340 - Training Loss: 0.2918541431427002, Testing Loss: 0.4672832190990448
Epoch 340 - RMSE: 0.6835811808200195, R-squared: 0.3462736166665824
Epoch 341 - Training Loss: 0.30199766159057617, Testing Loss: 0.4658249020576477
Epoch 341 - RMSE: 0.6825136983821648, R-squared: 0.3483137446785578
Epoch 342 - Training Loss: 0.28556951880455017, Testing Loss: 0.451450377702713
Epoch 342 - RMSE: 0.6719006062303181, R-squared: 0.36842361564014425
Epoch 343 - Training Loss: 0.29125383496284485, Testing Loss: 0.46029746532440186
Epoch 343 - RMSE: 0.67845230701533, R-squared: 0.35604656529255285
Epoch 344 - Training Loss: 0.2949572205543518, Testing Loss: 0.4606555104255676
Epoch 344 - RMSE: 0.6787160988465097, R-squared: 0.35554571157641446
Epoch 345 - Training Loss: 0.28907591104507446, Testing Loss: 0.45777028799057007
Epoch 345 - RMSE: 0.6765872322684503, R-squared: 0.3595821726294144
Epoch 346 - Training Loss: 0.3116517663002014, Testing Loss: 0.4731323719024658
Epoch 346 - RMSE: 0.6878461576199374, R-squared: 0.33809075343440564
Epoch 347 - Training Loss: 0.3052928149700165, Testing Loss: 0.4783543646335602
Epoch 347 - RMSE: 0.6916316628923138, R-squared: 0.3307851785895821
Epoch 348 - Training Loss: 0.29075944423675537, Testing Loss: 0.46615666151046753
Epoch 348 - RMSE: 0.682756658290541, R-squared: 0.34784969006717414
Epoch 349 - Training Loss: 0.30600064992904663, Testing Loss: 0.4714888334274292
Epoch 349 - RMSE: 0.6866504640758518, R-squared: 0.3403899673427495
Epoch 350 - Training Loss: 0.3099864721298218, Testing Loss: 0.49071720242500305
Epoch 350 - RMSE: 0.7005120927454829, R-squared: 0.31348964804445356
Epoch 351 - Training Loss: 0.2787697911262512, Testing Loss: 0.4590456485748291
Epoch 351 - RMSE: 0.6775290710196796, R-squared: 0.3577979528935781
Epoch 352 - Training Loss: 0.29182112216949463, Testing Loss: 0.4731104373931885
Epoch 352 - RMSE: 0.6878302151394551, R-squared: 0.33812143573985454
Epoch 353 - Training Loss: 0.283008337020874, Testing Loss: 0.45762795209884644
Epoch 353 - RMSE: 0.6764820275871506, R-squared: 0.3597813183183728
Epoch 354 - Training Loss: 0.2956084609031677, Testing Loss: 0.47141626477241516

Epoch 354 - RMSE: 0.6865975977931715, R-squared: 0.34049153222875295
Epoch 355 - Training Loss: 0.2938814163208008, Testing Loss: 0.4736311137676239
Epoch 355 - RMSE: 0.6882086589575307, R-squared: 0.33739290490917295
Epoch 356 - Training Loss: 0.3044642508029938, Testing Loss: 0.4670385420322418
Epoch 356 - RMSE: 0.6834021566120034, R-squared: 0.3466159828005706
Epoch 357 - Training Loss: 0.2980041801929474, Testing Loss: 0.4757905900478363
Epoch 357 - RMSE: 0.6897757896772196, R-squared: 0.33437180312691395
Epoch 358 - Training Loss: 0.29822447896003723, Testing Loss: 0.4789781868457794
Epoch 358 - RMSE: 0.6920824706409116, R-squared: 0.3299125015173381
Epoch 359 - Training Loss: 0.2821608781814575, Testing Loss: 0.46685078740119934
Epoch 359 - RMSE: 0.6832647923199442, R-squared: 0.34687861765481554
Epoch 360 - Training Loss: 0.28735747933387756, Testing Loss: 0.4684019684791565
Epoch 360 - RMSE: 0.6843990046729643, R-squared: 0.34470846871598904
Epoch 361 - Training Loss: 0.28494730591773987, Testing Loss: 0.4697820544242859
Epoch 361 - RMSE: 0.6854065019552751, R-squared: 0.3427777517724425
Epoch 362 - Training Loss: 0.2860066294670105, Testing Loss: 0.4562334716320038
Epoch 362 - RMSE: 0.6754505654347673, R-squared: 0.3617321695498379
Epoch 363 - Training Loss: 0.29007065296173096, Testing Loss: 0.4648668169975281
Epoch 363 - RMSE: 0.6818114279566581, R-squared: 0.3496541559581292
Epoch 364 - Training Loss: 0.28857502341270447, Testing Loss: 0.4743986129760742
Epoch 364 - RMSE: 0.6887659883703117, R-squared: 0.33631927716870313
Epoch 365 - Training Loss: 0.2923181653022766, Testing Loss: 0.4746379256248474
Epoch 365 - RMSE: 0.6889397040227404, R-squared: 0.33598445730027926
Epoch 366 - Training Loss: 0.28641971945762634, Testing Loss: 0.4592708647251129
Epoch 366 - RMSE: 0.6776952704495373, R-squared: 0.35748284698994026
Epoch 367 - Training Loss: 0.3132514953613281, Testing Loss: 0.48723313212394714
Epoch 367 - RMSE: 0.6980208536655371, R-squared: 0.31836385456921057
Epoch 368 - Training Loss: 0.29948800802230835, Testing Loss: 0.47233277559280396
Epoch 368 - RMSE: 0.6872647115991242, R-squared: 0.33920932283429206
Epoch 369 - Training Loss: 0.2925705909729004, Testing Loss: 0.47153615951538086
Epoch 369 - RMSE: 0.6866848826921232, R-squared: 0.340323839276767
Epoch 370 - Training Loss: 0.29741916060447693, Testing Loss: 0.48326051235198975
Epoch 370 - RMSE: 0.695169386482565, R-squared: 0.32392154839731047
Epoch 371 - Training Loss: 0.2866419553756714, Testing Loss: 0.48172950744628906
Epoch 371 - RMSE: 0.6940673730356108, R-squared: 0.32606334870692233
Epoch 372 - Training Loss: 0.2756815552711487, Testing Loss: 0.46006423234939575
Epoch 372 - RMSE: 0.6782803400437114, R-squared: 0.35637296903955296
Epoch 373 - Training Loss: 0.2832258641719818, Testing Loss: 0.4675309956073761
Epoch 373 - RMSE: 0.6837623459698973, R-squared: 0.3459270649029147
Epoch 374 - Training Loss: 0.28771159052848816, Testing Loss: 0.47430238127708435
Epoch 374 - RMSE: 0.6886961461767735, R-squared: 0.336453867343412
Epoch 375 - Training Loss: 0.28915226459503174, Testing Loss: 0.4767454266548157
Epoch 375 - RMSE: 0.6904675029694355, R-squared: 0.33303613801103205
Epoch 376 - Training Loss: 0.28791889548301697, Testing Loss: 0.47025197744369507
Epoch 376 - RMSE: 0.6857491947105988, R-squared: 0.34212038535685163
Epoch 377 - Training Loss: 0.2856586277484894, Testing Loss: 0.4708206355571747
Epoch 377 - RMSE: 0.6861636930643065, R-squared: 0.34132483960191484
Epoch 378 - Training Loss: 0.2833550274372101, Testing Loss: 0.4709813594818115
Epoch 378 - RMSE: 0.6862808239810272, R-squared: 0.3410999433821016
Epoch 379 - Training Loss: 0.3287597894668579, Testing Loss: 0.5220744013786316
Epoch 379 - RMSE: 0.7225471471983157, R-squared: 0.26962113394119636
Epoch 380 - Training Loss: 0.2804754078388214, Testing Loss: 0.4732844829559326
Epoch 380 - RMSE: 0.6879567412214128, R-squared: 0.3378779087704249
Epoch 381 - Training Loss: 0.2837759852409363, Testing Loss: 0.4683133661746979
Epoch 381 - RMSE: 0.6843342209514595, R-squared: 0.34483251978724927
Epoch 382 - Training Loss: 0.2854580879211426, Testing Loss: 0.4634036421775818
Epoch 382 - RMSE: 0.6807375869876343, R-squared: 0.3517011091892005
Epoch 383 - Training Loss: 0.2910171151161194, Testing Loss: 0.4756011366844177
Epoch 383 - RMSE: 0.6896384305002203, R-squared: 0.33463687777627915
Epoch 384 - Training Loss: 0.2749287188053131, Testing Loss: 0.46254846453666687
Epoch 384 - RMSE: 0.6801091261764752, R-squared: 0.35289758308317765
Epoch 385 - Training Loss: 0.27505335211753845, Testing Loss: 0.459110289812088
Epoch 385 - RMSE: 0.677576788814292, R-squared: 0.35770749022318926
Epoch 386 - Training Loss: 0.300608366727829, Testing Loss: 0.483853280544281
Epoch 386 - RMSE: 0.6955956451144615, R-squared: 0.3230921890073487
Epoch 387 - Training Loss: 0.28033775091171265, Testing Loss: 0.46654489636421204
Epoch 387 - RMSE: 0.68304091244599, R-squared: 0.34730655358511464
Epoch 388 - Training Loss: 0.2880456745624542, Testing Loss: 0.4696972072124481
Epoch 388 - RMSE: 0.6853445664193019, R-squared: 0.34289652383820335
Epoch 389 - Training Loss: 0.29383584856987, Testing Loss: 0.4867170453071594
Epoch 389 - RMSE: 0.6976510990520287, R-squared: 0.3190858139592475
Epoch 390 - Training Loss: 0.2838383913040161, Testing Loss: 0.4627607464790344

Epoch 390 - RMSE: 0.6802652276424495, R-squared: 0.35260049773448277
Epoch 391 - Training Loss: 0.27993476390838623, Testing Loss: 0.4631158113479614
Epoch 391 - RMSE: 0.6805260799865804, R-squared: 0.3521039030265446
Epoch 392 - Training Loss: 0.2945396602153778, Testing Loss: 0.4813461899757385
Epoch 392 - RMSE: 0.6937911866885053, R-squared: 0.3265995936764393
Epoch 393 - Training Loss: 0.2803640365600586, Testing Loss: 0.4682612121105194
Epoch 393 - RMSE: 0.6842960818629378, R-squared: 0.34490554490702874
Epoch 394 - Training Loss: 0.2936341166496277, Testing Loss: 0.47871580719947815
Epoch 394 - RMSE: 0.6918929521923505, R-squared: 0.33027944205005855
Epoch 395 - Training Loss: 0.3065311014652252, Testing Loss: 0.5016470551490784
Epoch 395 - RMSE: 0.7082704629892672, R-squared: 0.2981988453911122
Epoch 396 - Training Loss: 0.2857162058353424, Testing Loss: 0.481804758310318
Epoch 396 - RMSE: 0.694121580569326, R-squared: 0.3259580739979212
Epoch 397 - Training Loss: 0.29120054841041565, Testing Loss: 0.47661179304122925
Epoch 397 - RMSE: 0.6903707837983244, R-squared: 0.3332229785894294
Epoch 398 - Training Loss: 0.29190394282341003, Testing Loss: 0.489592045545578
Epoch 398 - RMSE: 0.6997085326157524, R-squared: 0.3150637420591553
Epoch 399 - Training Loss: 0.27415376901626587, Testing Loss: 0.46792611479759216
Epoch 399 - RMSE: 0.6840512527923835, R-squared: 0.34537422353648417
Epoch 400 - Training Loss: 0.2860705554485321, Testing Loss: 0.4865090250968933
Epoch 400 - RMSE: 0.6975019891971315, R-squared: 0.3193768481608409
Epoch 401 - Training Loss: 0.279668390750885, Testing Loss: 0.47339823842048645
Epoch 401 - RMSE: 0.6880394224799224, R-squared: 0.337718746502666
Epoch 402 - Training Loss: 0.2877008616924286, Testing Loss: 0.4751701354980469
Epoch 402 - RMSE: 0.6893258796222473, R-squared: 0.33523983925323064
Epoch 403 - Training Loss: 0.2873019278049469, Testing Loss: 0.481527179479599
Epoch 403 - RMSE: 0.6939215855831534, R-squared: 0.3263464370426107
Epoch 404 - Training Loss: 0.2814982831478119, Testing Loss: 0.4795047640800476
Epoch 404 - RMSE: 0.6924627959360757, R-squared: 0.3291758226918582
Epoch 405 - Training Loss: 0.2776435911655426, Testing Loss: 0.47075510025024414
Epoch 405 - RMSE: 0.6861159211723938, R-squared: 0.3414165525955406
Epoch 406 - Training Loss: 0.282968133687973, Testing Loss: 0.4796344041824341
Epoch 406 - RMSE: 0.6925564252013563, R-squared: 0.32899440349801323
Epoch 407 - Training Loss: 0.2782992720603943, Testing Loss: 0.4775433838367462
Epoch 407 - RMSE: 0.6910451549475854, R-squared: 0.3319196939953942
Epoch 408 - Training Loss: 0.29421311616897583, Testing Loss: 0.4846864342689514
Epoch 408 - RMSE: 0.6961942432114856, R-squared: 0.3219266553329774
Epoch 409 - Training Loss: 0.27620506286621094, Testing Loss: 0.47705143690109253
Epoch 409 - RMSE: 0.6906890902074914, R-squared: 0.3326079805838522
Epoch 410 - Training Loss: 0.29008275270462036, Testing Loss: 0.4835168421268463
Epoch 410 - RMSE: 0.6953537943285112, R-squared: 0.32356281364990214
Epoch 411 - Training Loss: 0.27932828664779663, Testing Loss: 0.4774286448955536
Epoch 411 - RMSE: 0.6909621028033922, R-squared: 0.33208026864754847
Epoch 412 - Training Loss: 0.37159907817840576, Testing Loss: 0.5686596035957336
Epoch 412 - RMSE: 0.754095215214031, R-squared: 0.2044487047736312
Epoch 413 - Training Loss: 0.29138219356536865, Testing Loss: 0.47736120223999023
Epoch 413 - RMSE: 0.6909133111224518, R-squared: 0.33217459444537323
Epoch 414 - Training Loss: 0.29147234559059143, Testing Loss: 0.48936429619789124
Epoch 414 - RMSE: 0.6995457878126907, R-squared: 0.31538232286205514
Epoch 415 - Training Loss: 0.27427664399147034, Testing Loss: 0.47640615701675415
Epoch 415 - RMSE: 0.6902218405962203, R-squared: 0.3335106535433119
Epoch 416 - Training Loss: 0.27751386165618896, Testing Loss: 0.48335370421409607
Epoch 416 - RMSE: 0.6952364260455728, R-squared: 0.323791145102012
Epoch 417 - Training Loss: 0.27673831582069397, Testing Loss: 0.4794725477695465
Epoch 417 - RMSE: 0.6924396073319992, R-squared: 0.32922074991651107
Epoch 418 - Training Loss: 0.2920879125595093, Testing Loss: 0.4799196124076843
Epoch 418 - RMSE: 0.6927623147979391, R-squared: 0.3285953786611805
Epoch 419 - Training Loss: 0.3008752465248108, Testing Loss: 0.4896847903728485
Epoch 419 - RMSE: 0.6997748109085583, R-squared: 0.3149339778679916
Epoch 420 - Training Loss: 0.27904993295669556, Testing Loss: 0.4791402518749237
Epoch 420 - RMSE: 0.692199564464162, R-squared: 0.32968573737275386
Epoch 421 - Training Loss: 0.2700756788253784, Testing Loss: 0.47244125604629517
Epoch 421 - RMSE: 0.6873436386229106, R-squared: 0.3390575407469264
Epoch 422 - Training Loss: 0.27736896276474, Testing Loss: 0.48285338282585144
Epoch 422 - RMSE: 0.694876506689483, R-squared: 0.3244911016872367
Epoch 423 - Training Loss: 0.28532543778419495, Testing Loss: 0.48688557744026184
Epoch 423 - RMSE: 0.697771830357464, R-squared: 0.3188501237356861
Epoch 424 - Training Loss: 0.2948334515094757, Testing Loss: 0.4869656562805176
Epoch 424 - RMSE: 0.6978292292439647, R-squared: 0.31873805600577443
Epoch 425 - Training Loss: 0.29423171281814575, Testing Loss: 0.4842512905597687
Epoch 425 - RMSE: 0.6958816705141154, R-squared: 0.32253539244073914
Epoch 426 - Training Loss: 0.2763572335243225, Testing Loss: 0.4738537669181824

Epoch 426 - RMSE: 0.6883703583165768, R-squared: 0.3370815001391513
Epoch 427 - Training Loss: 0.27381378412246704, Testing Loss: 0.4805285632610321
Epoch 427 - RMSE: 0.6932016767348627, R-squared: 0.3277434755701141
Epoch 428 - Training Loss: 0.27906107902526855, Testing Loss: 0.4834772050380707
Epoch 428 - RMSE: 0.6953252634979897, R-squared: 0.3236183218500377
Epoch 429 - Training Loss: 0.26739105582237244, Testing Loss: 0.4793286621570587
Epoch 429 - RMSE: 0.6923356335085084, R-squared: 0.32942217758303016
Epoch 430 - Training Loss: 0.28296253085136414, Testing Loss: 0.4908983111381531
Epoch 430 - RMSE: 0.7006413388711021, R-squared: 0.313236299131728
Epoch 431 - Training Loss: 0.2786393463611603, Testing Loss: 0.4770265221595764
Epoch 431 - RMSE: 0.6906710547750641, R-squared: 0.3326428343167016
Epoch 432 - Training Loss: 0.29408004879951477, Testing Loss: 0.4952012896537781
Epoch 432 - RMSE: 0.7037053827934959, R-squared: 0.3072164563635743
Epoch 433 - Training Loss: 0.26614800095558167, Testing Loss: 0.46619313955307007
Epoch 433 - RMSE: 0.6827834010290775, R-squared: 0.34779860121561745
Epoch 434 - Training Loss: 0.27062201499938965, Testing Loss: 0.47352102398872375
Epoch 434 - RMSE: 0.6881286633223388, R-squared: 0.3375469355048121
Epoch 435 - Training Loss: 0.27429983019828796, Testing Loss: 0.47569215297698975
Epoch 435 - RMSE: 0.6897044056678571, R-squared: 0.33450956601017157
Epoch 436 - Training Loss: 0.2648412883281708, Testing Loss: 0.4656117260456085
Epoch 436 - RMSE: 0.6823574787982966, R-squared: 0.34861203760579895
Epoch 437 - Training Loss: 0.2690895199775696, Testing Loss: 0.46754252910614014
Epoch 437 - RMSE: 0.6837707995388215, R-squared: 0.34591089178413803
Epoch 438 - Training Loss: 0.2606877088546753, Testing Loss: 0.46402156352996826
Epoch 438 - RMSE: 0.6811912941269193, R-squared: 0.35083664728421615
Epoch 439 - Training Loss: 0.29451146721839905, Testing Loss: 0.5089496970176697
Epoch 439 - RMSE: 0.7134071002701309, R-squared: 0.2879824939124144
Epoch 440 - Training Loss: 0.2692716121673584, Testing Loss: 0.478583425283432
Epoch 440 - RMSE: 0.6917972089881776, R-squared: 0.330464779262741
Epoch 441 - Training Loss: 0.2695968747138977, Testing Loss: 0.47721633315086365
Epoch 441 - RMSE: 0.6908084421665066, R-squared: 0.3323773082646233
Epoch 442 - Training Loss: 0.2732425034046173, Testing Loss: 0.4793209135532379
Epoch 442 - RMSE: 0.6923300586152121, R-squared: 0.32943297692535645
Epoch 443 - Training Loss: 0.2792969346046448, Testing Loss: 0.48469892144203186
Epoch 443 - RMSE: 0.6962032027796616, R-squared: 0.32190920249273525
Epoch 444 - Training Loss: 0.2894548177719116, Testing Loss: 0.49305135011672974
Epoch 444 - RMSE: 0.70217614297368, R-squared: 0.3102241953065855
Epoch 445 - Training Loss: 0.26780402660369873, Testing Loss: 0.47488686442375183
Epoch 445 - RMSE: 0.689120347903678, R-squared: 0.3356361943978379
Epoch 446 - Training Loss: 0.2756389081478119, Testing Loss: 0.48436275124549866
Epoch 446 - RMSE: 0.6959617508484264, R-squared: 0.3223794615802916
Epoch 447 - Training Loss: 0.275666207075119, Testing Loss: 0.4822932183742523
Epoch 447 - RMSE: 0.6944733681307534, R-squared: 0.32527467887136874
Epoch 448 - Training Loss: 0.271043598651886, Testing Loss: 0.4800592362880707
Epoch 448 - RMSE: 0.6928630770393194, R-squared: 0.328400052925121
Epoch 449 - Training Loss: 0.28376108407974243, Testing Loss: 0.5043242573738098
Epoch 449 - RMSE: 0.7101579409294595, R-squared: 0.2944533857585594
Epoch 450 - Training Loss: 0.26444417238235474, Testing Loss: 0.4803982675075531
Epoch 450 - RMSE: 0.6931077144836524, R-squared: 0.3279257095648571
Epoch 451 - Training Loss: 0.2663200795650482, Testing Loss: 0.47789591550827026
Epoch 451 - RMSE: 0.6913002014208843, R-squared: 0.3314264614816935
Epoch 452 - Training Loss: 0.2640623152256012, Testing Loss: 0.47251060605049133
Epoch 452 - RMSE: 0.6873940930507687, R-squared: 0.3389605042845525
Epoch 453 - Training Loss: 0.29092860221862793, Testing Loss: 0.4905429184436798
Epoch 453 - RMSE: 0.7003876993890898, R-squared: 0.31373344039451356
Epoch 454 - Training Loss: 0.28514015674591064, Testing Loss: 0.49747323989868164
Epoch 454 - RMSE: 0.7053178456072043, R-squared: 0.3040379456666925
Epoch 455 - Training Loss: 0.2660118341445923, Testing Loss: 0.4760395586490631
Epoch 455 - RMSE: 0.6899562151365098, R-squared: 0.3340235392945321
Epoch 456 - Training Loss: 0.2610572874546051, Testing Loss: 0.47364023327827454
Epoch 456 - RMSE: 0.6882152375262712, R-squared: 0.33738023716051824
Epoch 457 - Training Loss: 0.2640036344528198, Testing Loss: 0.4785136580467224
Epoch 457 - RMSE: 0.6917468131039614, R-squared: 0.33056232400566987
Epoch 458 - Training Loss: 0.26207464933395386, Testing Loss: 0.4781820774078369
Epoch 458 - RMSE: 0.6915070998140277, R-squared: 0.3310262084791301
Epoch 459 - Training Loss: 0.2689698338508606, Testing Loss: 0.4839474856853485
Epoch 459 - RMSE: 0.6956633380355765, R-squared: 0.3229604340230128
Epoch 460 - Training Loss: 0.2625814974308014, Testing Loss: 0.4792695939540863
Epoch 460 - RMSE: 0.6922929725224172, R-squared: 0.32950481562269884
Epoch 461 - Training Loss: 0.2575809359550476, Testing Loss: 0.46914875507354736
Epoch 461 - RMSE: 0.6849443745679352, R-squared: 0.34366370196296325
Epoch 462 - Training Loss: 0.2844858467578888, Testing Loss: 0.49713853001594543

Epoch 462 - RMSE: 0.705080532503591, R-squared: 0.30450619733762563
Epoch 463 - Training Loss: 0.26151958107948303, Testing Loss: 0.47673824429512024
Epoch 463 - RMSE: 0.6904623417057344, R-squared: 0.33304610912043264
Epoch 464 - Training Loss: 0.2715258300304413, Testing Loss: 0.49111083149909973
Epoch 464 - RMSE: 0.7007930144603672, R-squared: 0.3129389242606144
Epoch 465 - Training Loss: 0.277913361787796, Testing Loss: 0.49975112080574036
Epoch 465 - RMSE: 0.7069307482241145, R-squared: 0.30085129017671475
Epoch 466 - Training Loss: 0.2604339122772217, Testing Loss: 0.47910231351852417
Epoch 466 - RMSE: 0.6921721949647287, R-squared: 0.32973874463849107
Epoch 467 - Training Loss: 0.28120261430740356, Testing Loss: 0.4787096679210663
Epoch 467 - RMSE: 0.6918884824287703, R-squared: 0.3302880950732757
Epoch 468 - Training Loss: 0.2550484836101532, Testing Loss: 0.4710403084754944
Epoch 468 - RMSE: 0.6863237877887957, R-squared: 0.3410174414659667
Epoch 469 - Training Loss: 0.2696673572063446, Testing Loss: 0.48610660433769226
Epoch 469 - RMSE: 0.6972134293780402, R-squared: 0.31993988560218467
Epoch 470 - Training Loss: 0.2697369456291199, Testing Loss: 0.49120286107063293
Epoch 470 - RMSE: 0.7008586719364, R-squared: 0.3128101763752936
Epoch 471 - Training Loss: 0.2660562992095947, Testing Loss: 0.47784423828125
Epoch 471 - RMSE: 0.6912627702217752, R-squared: 0.33149886080016977
Epoch 472 - Training Loss: 0.2753472924232483, Testing Loss: 0.49467331171035767
Epoch 472 - RMSE: 0.7033302040390239, R-squared: 0.3079549710492616
Epoch 473 - Training Loss: 0.26806890964508057, Testing Loss: 0.48109370470046997
Epoch 473 - RMSE: 0.693609206644015, R-squared: 0.32695281051326797
Epoch 474 - Training Loss: 0.2692117393016815, Testing Loss: 0.4869169294834137
Epoch 474 - RMSE: 0.6977943356760962, R-squared: 0.31880618460960897
Epoch 475 - Training Loss: 0.25571778416633606, Testing Loss: 0.4741789698600769
Epoch 475 - RMSE: 0.6886065788675668, R-squared: 0.33662644904666517
Epoch 476 - Training Loss: 0.2617630958557129, Testing Loss: 0.4784235954284668
Epoch 476 - RMSE: 0.6916817417294283, R-squared: 0.33068826367045134
Epoch 477 - Training Loss: 0.2635893225669861, Testing Loss: 0.47866660356521606
Epoch 477 - RMSE: 0.6918573694478698, R-squared: 0.3303483251992013
Epoch 478 - Training Loss: 0.2628644108772278, Testing Loss: 0.48348820209503174
Epoch 478 - RMSE: 0.6953331473794265, R-squared: 0.32360298358040307
Epoch 479 - Training Loss: 0.2576024532318115, Testing Loss: 0.48571905493736267
Epoch 479 - RMSE: 0.6969354871564118, R-squared: 0.32048198572658204
Epoch 480 - Training Loss: 0.2773713767528534, Testing Loss: 0.4917276203632355
Epoch 480 - RMSE: 0.7012329157623473, R-squared: 0.3120760905389147
Epoch 481 - Training Loss: 0.2793246805667877, Testing Loss: 0.5107130408287048
Epoch 481 - RMSE: 0.7146418861248691, R-squared: 0.2855155994628339
Epoch 482 - Training Loss: 0.2557685077190399, Testing Loss: 0.4832037389278412
Epoch 482 - RMSE: 0.6951285586804747, R-squared: 0.3240009592206008
Epoch 483 - Training Loss: 0.27135327458381653, Testing Loss: 0.496747761964798
Epoch 483 - RMSE: 0.7048033651771421, R-squared: 0.30505288742579717
Epoch 484 - Training Loss: 0.2712915241718292, Testing Loss: 0.4869215190410614
Epoch 484 - RMSE: 0.6977976246237515, R-squared: 0.318799763187229
Epoch 485 - Training Loss: 0.2504177689552307, Testing Loss: 0.4723717272281647
Epoch 485 - RMSE: 0.687293043633653, R-squared: 0.3391548403914795
Epoch 486 - Training Loss: 0.2610584497451782, Testing Loss: 0.4806928038597107
Epoch 486 - RMSE: 0.6933201101047478, R-squared: 0.32751374615769646
Epoch 487 - Training Loss: 0.28704458475112915, Testing Loss: 0.5250181555747986
Epoch 487 - RMSE: 0.7245813976954996, R-squared: 0.26550274501211046
Epoch 488 - Training Loss: 0.2744942903518677, Testing Loss: 0.4883420467376709
Epoch 488 - RMSE: 0.6988147889673622, R-squared: 0.31681237436712184
Epoch 489 - Training Loss: 0.2807474732398987, Testing Loss: 0.48817387223243713
Epoch 489 - RMSE: 0.6986943831453224, R-squared: 0.3170477806071995
Epoch 490 - Training Loss: 0.2640162408351898, Testing Loss: 0.4854138195514679
Epoch 490 - RMSE: 0.6967164866500015, R-squared: 0.3209089733335665
Epoch 491 - Training Loss: 0.27304935455322266, Testing Loss: 0.4990536868572235
Epoch 491 - RMSE: 0.7064373185042447, R-squared: 0.30182694544862687
Epoch 492 - Training Loss: 0.25478774309158325, Testing Loss: 0.48143696784973145
Epoch 492 - RMSE: 0.6938566244159631, R-squared: 0.32647255870907055
Epoch 493 - Training Loss: 0.2690903842449188, Testing Loss: 0.49021244049072266
Epoch 493 - RMSE: 0.7001517382952326, R-squared: 0.31419576984629494
Epoch 494 - Training Loss: 0.257660448551178, Testing Loss: 0.47795236110687256
Epoch 494 - RMSE: 0.6913409635816152, R-squared: 0.3313476149677004
Epoch 495 - Training Loss: 0.26774778962135315, Testing Loss: 0.49489933252334595
Epoch 495 - RMSE: 0.7034908139585349, R-squared: 0.3076388692052535
Epoch 496 - Training Loss: 0.2672191560268402, Testing Loss: 0.5138270258903503
Epoch 496 - RMSE: 0.7168172177531908, R-squared: 0.2811592748278047
Epoch 497 - Training Loss: 0.25252753496170044, Testing Loss: 0.47706693410873413
Epoch 497 - RMSE: 0.6907003457467014, R-squared: 0.33258622863103715
Epoch 498 - Training Loss: 0.2667444348335266, Testing Loss: 0.49437031149864197

Epoch 498 - RMSE: 0.7031147357555608, R-squared: 0.3083789281402144
Epoch 499 - Training Loss: 0.2602454125881195, Testing Loss: 0.47527432441711426
Epoch 499 - RMSE: 0.689401439153797, R-squared: 0.33509409767957377
Epoch 500 - Training Loss: 0.27991798520088196, Testing Loss: 0.5064876079559326
Epoch 500 - RMSE: 0.711679432466641, R-squared: 0.29142692335326825
Epoch 501 - Training Loss: 0.24865077435970306, Testing Loss: 0.4795741140842438
Epoch 501 - RMSE: 0.6925129265487419, R-squared: 0.32907869099187115
Epoch 502 - Training Loss: 0.26103368401527405, Testing Loss: 0.4936644434928894
Epoch 502 - RMSE: 0.7026125792066912, R-squared: 0.30936647117786675
Epoch 503 - Training Loss: 0.2508184015750885, Testing Loss: 0.47802504897117615
Epoch 503 - RMSE: 0.6913935331931601, R-squared: 0.33124592236035955
Epoch 504 - Training Loss: 0.25609293580055237, Testing Loss: 0.48964783549308777
Epoch 504 - RMSE: 0.6997484004227694, R-squared: 0.31498568760299106
Epoch 505 - Training Loss: 0.24621492624282837, Testing Loss: 0.4679662585258484
Epoch 505 - RMSE: 0.6840806248823875, R-squared: 0.34531800511732036
Epoch 506 - Training Loss: 0.2672828137874603, Testing Loss: 0.49742352962493896
Epoch 506 - RMSE: 0.7052825485670644, R-squared: 0.30410760159853456
Epoch 507 - Training Loss: 0.26619869470596313, Testing Loss: 0.49002689123153687
Epoch 507 - RMSE: 0.7000191966540811, R-squared: 0.3144553964659347
Epoch 508 - Training Loss: 0.25433215498924255, Testing Loss: 0.48323696851730347
Epoch 508 - RMSE: 0.6951524853599134, R-squared: 0.32395442195633994
Epoch 509 - Training Loss: 0.2545577585697174, Testing Loss: 0.47319650650024414
Epoch 509 - RMSE: 0.6878927714913935, R-squared: 0.33800103803030435
Epoch 510 - Training Loss: 0.29547202587127686, Testing Loss: 0.5277871489524841
Epoch 510 - RMSE: 0.7264895911109042, R-squared: 0.2616290371141532
Epoch 511 - Training Loss: 0.2478710561990738, Testing Loss: 0.47680965065956116
Epoch 511 - RMSE: 0.6905140452137435, R-squared: 0.3329462191050806
Epoch 512 - Training Loss: 0.2717144787311554, Testing Loss: 0.5022099614143372
Epoch 512 - RMSE: 0.7086677047229955, R-squared: 0.2974113979348495
Epoch 513 - Training Loss: 0.27461835741996765, Testing Loss: 0.5002143383026123
Epoch 513 - RMSE: 0.7072583169289868, R-squared: 0.30020321453989585
Epoch 514 - Training Loss: 0.2532820701599121, Testing Loss: 0.4821021854877472
Epoch 514 - RMSE: 0.6943357893591906, R-squared: 0.32554198555364233
Epoch 515 - Training Loss: 0.27087128162384033, Testing Loss: 0.4873361587524414
Epoch 515 - RMSE: 0.6980946708748361, R-squared: 0.31821967796392236
Epoch 516 - Training Loss: 0.25149428844451904, Testing Loss: 0.4768678545951843
Epoch 516 - RMSE: 0.6905561836935586, R-squared: 0.33286480297708587
Epoch 517 - Training Loss: 0.25523462891578674, Testing Loss: 0.48131686449050903
Epoch 517 - RMSE: 0.6937700363659324, R-squared: 0.32664065046411084
Epoch 518 - Training Loss: 0.2593703269958496, Testing Loss: 0.49997299909591675
Epoch 518 - RMSE: 0.7070877150699192, R-squared: 0.3005407778622139
Epoch 519 - Training Loss: 0.2469230592250824, Testing Loss: 0.48808085918426514
Epoch 519 - RMSE: 0.6986278313149549, R-squared: 0.31717787913575124
Epoch 520 - Training Loss: 0.281232088804245, Testing Loss: 0.5222741961479187
Epoch 520 - RMSE: 0.7226854438601088, R-squared: 0.26934151585385424
Epoch 521 - Training Loss: 0.25879818201065063, Testing Loss: 0.4976668655872345
Epoch 521 - RMSE: 0.7054550748122913, R-squared: 0.30376710150441844
Epoch 522 - Training Loss: 0.24634075164794922, Testing Loss: 0.4902527332305908
Epoch 522 - RMSE: 0.7001805007124482, R-squared: 0.31413942265331074
Epoch 523 - Training Loss: 0.2507060766220093, Testing Loss: 0.4898165762424469
Epoch 523 - RMSE: 0.699868967355903, R-squared: 0.3147496107790926
Epoch 524 - Training Loss: 0.25032031536102295, Testing Loss: 0.49158692359924316
Epoch 524 - RMSE: 0.7011325817397202, R-squared: 0.3122729359339905
Epoch 525 - Training Loss: 0.2467750906944275, Testing Loss: 0.47912657260894775
Epoch 525 - RMSE: 0.6921897338179261, R-squared: 0.32970477689813915
Epoch 526 - Training Loss: 0.24497713148593903, Testing Loss: 0.46618369221687317
Epoch 526 - RMSE: 0.6827764885141796, R-squared: 0.3478118069527736
Epoch 527 - Training Loss: 0.2581535279750824, Testing Loss: 0.49364718794822693
Epoch 527 - RMSE: 0.7026003087862372, R-squared: 0.3093905934040575
Epoch 528 - Training Loss: 0.24319177865982056, Testing Loss: 0.4822872281074524
Epoch 528 - RMSE: 0.6944690361195104, R-squared: 0.3252830964974288
Epoch 529 - Training Loss: 0.2578328549861908, Testing Loss: 0.4958074390888214
Epoch 529 - RMSE: 0.7041359548471646, R-squared: 0.30636841825590555
Epoch 530 - Training Loss: 0.2488551139831543, Testing Loss: 0.4773939847946167
Epoch 530 - RMSE: 0.6909370327134433, R-squared: 0.33212873586130975
Epoch 531 - Training Loss: 0.24528811872005463, Testing Loss: 0.4718109667301178
Epoch 531 - RMSE: 0.6868850050391306, R-squared: 0.3399392809975623
Epoch 532 - Training Loss: 0.25064489245414734, Testing Loss: 0.4851987361907959
Epoch 532 - RMSE: 0.6965620998791989, R-squared: 0.32120990220937284
Epoch 533 - Training Loss: 0.26343631744384766, Testing Loss: 0.4896930456161499
Epoch 533 - RMSE: 0.6997807052612618, R-squared: 0.31492243690451815
Epoch 534 - Training Loss: 0.2733480930328369, Testing Loss: 0.5119606852531433

Epoch 534 - RMSE: 0.7155142687643958, R-squared: 0.28377015397124206
Epoch 535 - Training Loss: 0.2377074658870697, Testing Loss: 0.4745624363422394
Epoch 535 - RMSE: 0.6888849039858961, R-squared: 0.3360900881088742
Epoch 536 - Training Loss: 0.2485578954219818, Testing Loss: 0.48790377378463745
Epoch 536 - RMSE: 0.6985010967195894, R-squared: 0.3174255913858961
Epoch 537 - Training Loss: 0.24662989377975464, Testing Loss: 0.49644529819488525
Epoch 537 - RMSE: 0.7045887676479615, R-squared: 0.305476016021921
Epoch 538 - Training Loss: 0.25338175892829895, Testing Loss: 0.5084941387176514
Epoch 538 - RMSE: 0.7130877249934412, R-squared: 0.2886198575915383
Epoch 539 - Training Loss: 0.256826788187027, Testing Loss: 0.49816617369651794
Epoch 539 - RMSE: 0.7058088856862786, R-squared: 0.3030685551279072
Epoch 540 - Training Loss: 0.25041866302490234, Testing Loss: 0.49883952736854553
Epoch 540 - RMSE: 0.7062856882640424, R-squared: 0.302126626068015
Epoch 541 - Training Loss: 0.2651577293872833, Testing Loss: 0.5051970481872559
Epoch 541 - RMSE: 0.7107721302608047, R-squared: 0.2932324556871747
Epoch 542 - Training Loss: 0.25196802616119385, Testing Loss: 0.4921117126941681
Epoch 542 - RMSE: 0.7015067490117203, R-squared: 0.3115387135391904
Epoch 543 - Training Loss: 0.2837405800819397, Testing Loss: 0.5226507782936096
Epoch 543 - RMSE: 0.722945893020078, R-squared: 0.26881477581471735
Epoch 544 - Training Loss: 0.25184574723243713, Testing Loss: 0.4901517331600189
Epoch 544 - RMSE: 0.7001083710040935, R-squared: 0.31428072443255306
Epoch 545 - Training Loss: 0.2732309103012085, Testing Loss: 0.5041873455047607
Epoch 545 - RMSE: 0.7100614937038149, R-squared: 0.2946450146589832
Epoch 546 - Training Loss: 0.2476085126399994, Testing Loss: 0.4832976758480072
Epoch 546 - RMSE: 0.6951961203515911, R-squared: 0.3238695480052789
Epoch 547 - Training Loss: 0.2858075797557831, Testing Loss: 0.5395491123199463
Epoch 547 - RMSE: 0.7345400966349552, R-squared: 0.24517403244253178
Epoch 548 - Training Loss: 0.2610643208026886, Testing Loss: 0.49428316950798035
Epoch 548 - RMSE: 0.7030527381388391, R-squared: 0.3085008910731848
Epoch 549 - Training Loss: 0.24527643620967865, Testing Loss: 0.4879653751850128
Epoch 549 - RMSE: 0.6985451541245367, R-squared: 0.31733948298702197
Epoch 550 - Training Loss: 0.24545636773109436, Testing Loss: 0.47847792506217957
Epoch 550 - RMSE: 0.6917209900198195, R-squared: 0.33061230362955674
Epoch 551 - Training Loss: 0.2524566054344177, Testing Loss: 0.4991970956325531
Epoch 551 - RMSE: 0.7065388096783534, R-squared: 0.30162632328113825
Epoch 552 - Training Loss: 0.2445850819349289, Testing Loss: 0.5025351047515869
Epoch 552 - RMSE: 0.7088971418189822, R-squared: 0.2969563864185556
Epoch 553 - Training Loss: 0.2564902901649475, Testing Loss: 0.5009176135063171
Epoch 553 - RMSE: 0.7077553386577343, R-squared: 0.29921931258505485
Epoch 554 - Training Loss: 0.2605016231536865, Testing Loss: 0.5085384845733643
Epoch 554 - RMSE: 0.7131188361708408, R-squared: 0.2885577828822785
Epoch 555 - Training Loss: 0.24571752548217773, Testing Loss: 0.49986863136291504
Epoch 555 - RMSE: 0.7070138765639793, R-squared: 0.3006868540170554
Epoch 556 - Training Loss: 0.23706047236919403, Testing Loss: 0.48689693212509155
Epoch 556 - RMSE: 0.6977800373918143, R-squared: 0.3188341005800803
Epoch 557 - Training Loss: 0.2685927748680115, Testing Loss: 0.5167261958122253
Epoch 557 - RMSE: 0.7188367411921782, R-squared: 0.27710312033984164
Epoch 558 - Training Loss: 0.2524013817310333, Testing Loss: 0.48919162154197693
Epoch 558 - RMSE: 0.6994223429321449, R-squared: 0.31562392274621154
Epoch 559 - Training Loss: 0.24488461017608643, Testing Loss: 0.48710504174232483
Epoch 559 - RMSE: 0.6979291178497177, R-squared: 0.3185430077810474
Epoch 560 - Training Loss: 0.2726326882839203, Testing Loss: 0.5254791378974915
Epoch 560 - RMSE: 0.7248993722603113, R-squared: 0.26485795150376845
Epoch 561 - Training Loss: 0.2514421343803406, Testing Loss: 0.5005700588226318
Epoch 561 - RMSE: 0.7075097940595682, R-squared: 0.29970547794164015
Epoch 562 - Training Loss: 0.26012811064720154, Testing Loss: 0.5127049088478088
Epoch 562 - RMSE: 0.7160341376134144, R-squared: 0.28272899834681353
Epoch 563 - Training Loss: 0.2581600248813629, Testing Loss: 0.5059102177619934
Epoch 563 - RMSE: 0.7112736558842376, R-squared: 0.2922347038801143
Epoch 564 - Training Loss: 0.282875120639801, Testing Loss: 0.5294431447982788
Epoch 564 - RMSE: 0.7276284571988094, R-squared: 0.25931223925709723
Epoch 565 - Training Loss: 0.25055113434791565, Testing Loss: 0.5075817108154297
Epoch 565 - RMSE: 0.7124476869873813, R-squared: 0.28989629519690086
Epoch 566 - Training Loss: 0.25564780831336975, Testing Loss: 0.508682906627655
Epoch 566 - RMSE: 0.7132201303559657, R-squared: 0.28835565646467476
Epoch 567 - Training Loss: 0.2460586130619049, Testing Loss: 0.5063400268554688
Epoch 567 - RMSE: 0.7115757559696174, R-squared: 0.2916333562503598
Epoch 568 - Training Loss: 0.2633923292160034, Testing Loss: 0.5124895572662354
Epoch 568 - RMSE: 0.7158837723950153, R-squared: 0.2830302166289391
Epoch 569 - Training Loss: 0.24796858429908752, Testing Loss: 0.5036481022834778
Epoch 569 - RMSE: 0.7096817177531191, R-squared: 0.2953993302376312
Epoch 570 - Training Loss: 0.24089208245277405, Testing Loss: 0.4965865910053253

Epoch 570 - RMSE: 0.7046890047660916, R-squared: 0.3052783914278294
Epoch 571 - Training Loss: 0.2486811876296997, Testing Loss: 0.5042199492454529
Epoch 571 - RMSE: 0.7100844219229627, R-squared: 0.29459946143596316
Epoch 572 - Training Loss: 0.24870944023132324, Testing Loss: 0.4975697696208954
Epoch 572 - RMSE: 0.7053862391004261, R-squared: 0.3039029665671187
Epoch 573 - Training Loss: 0.2491842657327652, Testing Loss: 0.5086221694946289
Epoch 573 - RMSE: 0.713177495706656, R-squared: 0.2884407348265432
Epoch 574 - Training Loss: 0.2411883920431137, Testing Loss: 0.4902150332927704
Epoch 574 - RMSE: 0.7001535835807176, R-squared: 0.3141921548977348
Epoch 575 - Training Loss: 0.2567189335823059, Testing Loss: 0.5144765377044678
Epoch 575 - RMSE: 0.7172702123812486, R-squared: 0.28025044097011464
Epoch 576 - Training Loss: 0.24088694155216217, Testing Loss: 0.4839940071105957
Epoch 576 - RMSE: 0.6956967893408023, R-squared: 0.3228953209131228
Epoch 577 - Training Loss: 0.2351333498954773, Testing Loss: 0.4863077998161316
Epoch 577 - RMSE: 0.697357738546523, R-squared: 0.3196583389139469
Epoch 578 - Training Loss: 0.243356391787529, Testing Loss: 0.500072181224823
Epoch 578 - RMSE: 0.7071578552845081, R-squared: 0.3004020039811861
Epoch 579 - Training Loss: 0.2441088706254959, Testing Loss: 0.5018508434295654
Epoch 579 - RMSE: 0.7084143489862248, R-squared: 0.29791367292914117
Epoch 580 - Training Loss: 0.23643356561660767, Testing Loss: 0.5003108382225037
Epoch 580 - RMSE: 0.7073265007499908, R-squared: 0.3000682790641014
Epoch 581 - Training Loss: 0.257357120513916, Testing Loss: 0.5001416802406311
Epoch 581 - RMSE: 0.707206988332088, R-squared: 0.3003047850208287
Epoch 582 - Training Loss: 0.24483896791934967, Testing Loss: 0.5021533370018005
Epoch 582 - RMSE: 0.7086277767677424, R-squared: 0.297490566593996
Epoch 583 - Training Loss: 0.2411470264196396, Testing Loss: 0.49837204813957214
Epoch 583 - RMSE: 0.7059547109157607, R-squared: 0.30278054320652303
Epoch 584 - Training Loss: 0.2804620862007141, Testing Loss: 0.5159194469451904
Epoch 584 - RMSE: 0.7182753072047363, R-squared: 0.27823188953086164
Epoch 585 - Training Loss: 0.2405867725610733, Testing Loss: 0.49666306376457214
Epoch 585 - RMSE: 0.7047432726513864, R-squared: 0.3051713867094792
Epoch 586 - Training Loss: 0.24892224371433258, Testing Loss: 0.5047400593757629
Epoch 586 - RMSE: 0.7104506242985118, R-squared: 0.2938717001874215
Epoch 587 - Training Loss: 0.23956850171089172, Testing Loss: 0.4985227584838867
Epoch 587 - RMSE: 0.7060614462776478, R-squared: 0.3025696979621457
Epoch 588 - Training Loss: 0.27436384558677673, Testing Loss: 0.5327745676040649
Epoch 588 - RMSE: 0.7299141108513214, R-squared: 0.25465157856766585
Epoch 589 - Training Loss: 0.27220985293388367, Testing Loss: 0.5272399187088013
Epoch 589 - RMSE: 0.7261128438557058, R-squared: 0.2623946560771079
Epoch 590 - Training Loss: 0.24624581634998322, Testing Loss: 0.5007868409156799
Epoch 590 - RMSE: 0.707662931544496, R-squared: 0.2994022935937106
Epoch 591 - Training Loss: 0.23707203567028046, Testing Loss: 0.49962303042411804
Epoch 591 - RMSE: 0.7068401906274155, R-squared: 0.3010304001442865
Epoch 592 - Training Loss: 0.2487739473581314, Testing Loss: 0.5044687986373901
Epoch 592 - RMSE: 0.7102596945504057, R-squared: 0.2942511854819968
Epoch 593 - Training Loss: 0.24976307153701782, Testing Loss: 0.5077993273735046
Epoch 593 - RMSE: 0.7126003771588869, R-squared: 0.2895918869512275
Epoch 594 - Training Loss: 0.25104063749313354, Testing Loss: 0.500590980052948
Epoch 594 - RMSE: 0.70752455477974, R-squared: 0.2996762572597692
Epoch 595 - Training Loss: 0.23834635317325592, Testing Loss: 0.49485984444618225
Epoch 595 - RMSE: 0.7034627605067798, R-squared: 0.30769408735998083
Epoch 596 - Training Loss: 0.2454599142074585, Testing Loss: 0.4938397705554962
Epoch 596 - RMSE: 0.7027373362611217, R-squared: 0.30912118933470634
Epoch 597 - Training Loss: 0.23586581647396088, Testing Loss: 0.48388671875
Epoch 597 - RMSE: 0.6956196612527079, R-squared: 0.3230454463564343
Epoch 598 - Training Loss: 0.24693478643894196, Testing Loss: 0.5090827941894531
Epoch 598 - RMSE: 0.7135003829825372, R-squared: 0.28779627971134725
Epoch 599 - Training Loss: 0.23646140098571777, Testing Loss: 0.5074108242988586
Epoch 599 - RMSE: 0.7123277121521462, R-squared: 0.29013543528602537
Epoch 600 - Training Loss: 0.23248794674873352, Testing Loss: 0.4867084324359894
Epoch 600 - RMSE: 0.6976449061337393, R-squared: 0.3190979026012807
Epoch 601 - Training Loss: 0.25412672758102417, Testing Loss: 0.49590492248535156
Epoch 601 - RMSE: 0.704205173017617, R-squared: 0.30623204041987595
Epoch 602 - Training Loss: 0.24716417491436005, Testing Loss: 0.5076507925987244
Epoch 602 - RMSE: 0.7124961692845003, R-squared: 0.2897996463317831
Epoch 603 - Training Loss: 0.2480776011943817, Testing Loss: 0.507305920124054
Epoch 603 - RMSE: 0.7122540975865331, R-squared: 0.290282147734527
Epoch 604 - Training Loss: 0.23109027743339539, Testing Loss: 0.49266600608825684
Epoch 604 - RMSE: 0.701901714088329, R-squared: 0.31076325496135837
Epoch 605 - Training Loss: 0.2890840470790863, Testing Loss: 0.5432289838790894
Epoch 605 - RMSE: 0.7370406971272261, R-squared: 0.2400259648529114
Epoch 606 - Training Loss: 0.2445218414068222, Testing Loss: 0.49779212474823

Epoch 606 - RMSE: 0.705543825982121, R-squared: 0.3035913085734392
Epoch 607 - Training Loss: 0.28177180886268616, Testing Loss: 0.5328687429428101
Epoch 607 - RMSE: 0.7299785965635327, R-squared: 0.2545198741759952
Epoch 608 - Training Loss: 0.23506014049053192, Testing Loss: 0.49972110986709595
Epoch 608 - RMSE: 0.7069095483491002, R-squared: 0.30089322255285833
Epoch 609 - Training Loss: 0.24091526865959167, Testing Loss: 0.5179827213287354
Epoch 609 - RMSE: 0.7197101767885797, R-squared: 0.2753453151794518
Epoch 610 - Training Loss: 0.2279835343360901, Testing Loss: 0.49306780099868774
Epoch 610 - RMSE: 0.7021878726396676, R-squared: 0.31020115007084503
Epoch 611 - Training Loss: 0.2440754622220993, Testing Loss: 0.5043375492095947
Epoch 611 - RMSE: 0.7101672741737896, R-squared: 0.29443484035667244
Epoch 612 - Training Loss: 0.25640854239463806, Testing Loss: 0.5191192030906677
Epoch 612 - RMSE: 0.7204992662624642, R-squared: 0.27375542282435883
Epoch 613 - Training Loss: 0.2321285903453827, Testing Loss: 0.4969938397407532
Epoch 613 - RMSE: 0.7049778995075388, R-squared: 0.3047086576645165
Epoch 614 - Training Loss: 0.23076216876506805, Testing Loss: 0.4975036084651947
Epoch 614 - RMSE: 0.7053393566103602, R-squared: 0.3039954936847017
Epoch 615 - Training Loss: 0.2404986023902893, Testing Loss: 0.5005754232406616
Epoch 615 - RMSE: 0.7075135652752644, R-squared: 0.29969801240899496
Epoch 616 - Training Loss: 0.24301530420780182, Testing Loss: 0.49735477566719055
Epoch 616 - RMSE: 0.7052338430113808, R-squared: 0.30420371245709865
Epoch 617 - Training Loss: 0.25181499123573303, Testing Loss: 0.5122811198234558
Epoch 617 - RMSE: 0.7157382033189433, R-squared: 0.2833217667987009
Epoch 618 - Training Loss: 0.23394417762756348, Testing Loss: 0.5013628005981445
Epoch 618 - RMSE: 0.7080697432710972, R-squared: 0.29859656173569515
Epoch 619 - Training Loss: 0.2433793991804123, Testing Loss: 0.5179618000984192
Epoch 619 - RMSE: 0.7196956409115618, R-squared: 0.2753745863648458
Epoch 620 - Training Loss: 0.24527980387210846, Testing Loss: 0.5051478743553162
Epoch 620 - RMSE: 0.7107375331116264, R-squared: 0.293301258460988
Epoch 621 - Training Loss: 0.2408682405948639, Testing Loss: 0.5094339847564697
Epoch 621 - RMSE: 0.7137464290278265, R-squared: 0.28730499721923786
Epoch 622 - Training Loss: 0.2353195697069168, Testing Loss: 0.504928469657898
Epoch 622 - RMSE: 0.7105832097961969, R-squared: 0.2936081178782768
Epoch 623 - Training Loss: 0.24265050888061523, Testing Loss: 0.50709068775177
Epoch 623 - RMSE: 0.7121029954706891, R-squared: 0.2905832439141598
Epoch 624 - Training Loss: 0.24899278581142426, Testing Loss: 0.5083842277526855
Epoch 624 - RMSE: 0.7130106456620272, R-squared: 0.2887736387893858
Epoch 625 - Training Loss: 0.2591973543167114, Testing Loss: 0.5199822783470154
Epoch 625 - RMSE: 0.7210979632697458, R-squared: 0.2725479792545009
Epoch 626 - Training Loss: 0.2375909388065338, Testing Loss: 0.5017502307891846
Epoch 626 - RMSE: 0.7083432786681156, R-squared: 0.298054536805602
Epoch 627 - Training Loss: 0.23111774027347565, Testing Loss: 0.49139976501464844
Epoch 627 - RMSE: 0.7009991586153773, R-squared: 0.312534655230141
Epoch 628 - Training Loss: 0.26323753595352173, Testing Loss: 0.5248898267745972
Epoch 628 - RMSE: 0.7244927894922258, R-squared: 0.2656823756315303
Epoch 629 - Training Loss: 0.24551261961460114, Testing Loss: 0.5106784701347351
Epoch 629 - RMSE: 0.7146176805633685, R-squared: 0.28556399909779573
Epoch 630 - Training Loss: 0.239985391497612, Testing Loss: 0.5112643241882324
Epoch 630 - RMSE: 0.7150274963391413, R-squared: 0.2847443409643592
Epoch 631 - Training Loss: 0.2407362163066864, Testing Loss: 0.503773033618927
Epoch 631 - RMSE: 0.7097696933509168, R-squared: 0.2952246279570836
Epoch 632 - Training Loss: 0.24560660123825073, Testing Loss: 0.5052462816238403
Epoch 632 - RMSE: 0.7108067212697012, R-squared: 0.29316366177624165
Epoch 633 - Training Loss: 0.23236924409866333, Testing Loss: 0.49297231435775757
Epoch 633 - RMSE: 0.7021198827824604, R-squared: 0.3103347241657699
Epoch 634 - Training Loss: 0.2609569728374481, Testing Loss: 0.5216010808944702
Epoch 634 - RMSE: 0.7222195648410334, R-squared: 0.27028324988729047
Epoch 635 - Training Loss: 0.22792986035346985, Testing Loss: 0.5000370740890503
Epoch 635 - RMSE: 0.7071329987695774, R-squared: 0.30045118469036713
Epoch 636 - Training Loss: 0.2391013354063034, Testing Loss: 0.5030571818351746
Epoch 636 - RMSE: 0.7092652597593657, R-squared: 0.2962260402295328
Epoch 637 - Training Loss: 0.23427656292915344, Testing Loss: 0.5102435946464539
Epoch 637 - RMSE: 0.7143133831908152, R-squared: 0.28617230957532513
Epoch 638 - Training Loss: 0.24871081113815308, Testing Loss: 0.5204737186431885
Epoch 638 - RMSE: 0.721438637276828, R-squared: 0.2718604650796802
Epoch 639 - Training Loss: 0.233145609498024, Testing Loss: 0.5013853907585144
Epoch 639 - RMSE: 0.7080857293576934, R-squared: 0.2985648902152437
Epoch 640 - Training Loss: 0.23553763329982758, Testing Loss: 0.5113438963890076
Epoch 640 - RMSE: 0.7150831228016175, R-squared: 0.28463304821008817
Epoch 641 - Training Loss: 0.22621017694473267, Testing Loss: 0.4949181079864502
Epoch 641 - RMSE: 0.7035041566861479, R-squared: 0.30761260568226034
Epoch 642 - Training Loss: 0.2311089038848877, Testing Loss: 0.5025706887245178

Epoch 642 - RMSE: 0.2989222564316885, R-squared: 0.296906571065109
Epoch 643 - Training Loss: 0.23559856414794922, Testing Loss: 0.5171037316322327
Epoch 643 - RMSE: 0.7190992338718345, R-squared: 0.276575073360681
Epoch 644 - Training Loss: 0.2347402423620224, Testing Loss: 0.513097882270813
Epoch 644 - RMSE: 0.7163084532427352, R-squared: 0.2821793141197676
Epoch 645 - Training Loss: 0.22965708374977112, Testing Loss: 0.507749617099762
Epoch 645 - RMSE: 0.712565519433377, R-squared: 0.2896613862277839
Epoch 646 - Training Loss: 0.23406833410263062, Testing Loss: 0.5084201693534851
Epoch 646 - RMSE: 0.7130358986620838, R-squared: 0.2887232582866308
Epoch 647 - Training Loss: 0.23430778086185455, Testing Loss: 0.5087358951568604
Epoch 647 - RMSE: 0.7132572153577044, R-squared: 0.28828164840818993
Epoch 648 - Training Loss: 0.22976002097129822, Testing Loss: 0.5022146701812744
Epoch 648 - RMSE: 0.7086710920676611, R-squared: 0.2974046813441954
Epoch 649 - Training Loss: 0.23041322827339172, Testing Loss: 0.5087082386016846
Epoch 649 - RMSE: 0.713237892179336, R-squared: 0.28832021086243476
Epoch 650 - Training Loss: 0.23619823157787323, Testing Loss: 0.5004610419273376
Epoch 650 - RMSE: 0.7074327481186624, R-squared: 0.29985799007093084
Epoch 651 - Training Loss: 0.23119595646858215, Testing Loss: 0.506393551826477
Epoch 651 - RMSE: 0.7116133251726314, R-squared: 0.29155855473396786
Epoch 652 - Training Loss: 0.22529317438602448, Testing Loss: 0.49811941385269165
Epoch 652 - RMSE: 0.7057757671434192, R-squared: 0.3031339575700529
Epoch 653 - Training Loss: 0.2248217612504959, Testing Loss: 0.5002408623695374
Epoch 653 - RMSE: 0.7072771002918151, R-squared: 0.3001660436472843
Epoch 654 - Training Loss: 0.23001796007156372, Testing Loss: 0.5098209977149963
Epoch 654 - RMSE: 0.7140175682341707, R-squared: 0.28676341479263734
Epoch 655 - Training Loss: 0.23398776352405548, Testing Loss: 0.518626868724823
Epoch 655 - RMSE: 0.7201575679352012, R-squared: 0.27444441055876352
Epoch 656 - Training Loss: 0.24550573527812958, Testing Loss: 0.5277708172798157
Epoch 656 - RMSE: 0.7264783100878447, R-squared: 0.2616519679731476
Epoch 657 - Training Loss: 0.23476213216781616, Testing Loss: 0.49735531210899353
Epoch 657 - RMSE: 0.7052342241332363, R-squared: 0.30420296041365547
Epoch 658 - Training Loss: 0.22917240858078003, Testing Loss: 0.5023442506790161
Epoch 658 - RMSE: 0.7087625086430749, R-squared: 0.2972234040173136
Epoch 659 - Training Loss: 0.22713139653205872, Testing Loss: 0.49954459071159363
Epoch 659 - RMSE: 0.7067846732332895, R-squared: 0.3011401942599612
Epoch 660 - Training Loss: 0.23696936666965485, Testing Loss: 0.5185795426368713
Epoch 660 - RMSE: 0.7201246923570072, R-squared: 0.27451034810496844
Epoch 661 - Training Loss: 0.22507508099079132, Testing Loss: 0.5010315179824829
Epoch 661 - RMSE: 0.7078358161589802, R-squared: 0.2990599346702143
Epoch 662 - Training Loss: 0.22904299199581146, Testing Loss: 0.4858352541923523
Epoch 662 - RMSE: 0.6970188200977117, R-squared: 0.3203194753615527
Epoch 663 - Training Loss: 0.22677713632583618, Testing Loss: 0.5003818869590759
Epoch 663 - RMSE: 0.7073767749281178, R-squared: 0.2999687783596535
Epoch 664 - Training Loss: 0.22810432314872742, Testing Loss: 0.49949270486831665
Epoch 664 - RMSE: 0.7067480040490091, R-squared: 0.30121270843633563
Epoch 665 - Training Loss: 0.23937144875526428, Testing Loss: 0.5195671319961548
Epoch 665 - RMSE: 0.7208100272422135, R-squared: 0.2731288097016491
Epoch 666 - Training Loss: 0.2307983636856079, Testing Loss: 0.4930720031261444
Epoch 666 - RMSE: 0.7021908543887765, R-squared: 0.3101952917769236
Epoch 667 - Training Loss: 0.24360494315624237, Testing Loss: 0.5120358467102051
Epoch 667 - RMSE: 0.7155668250663036, R-squared: 0.2836649323813165
Epoch 668 - Training Loss: 0.2502133250236511, Testing Loss: 0.5251463651657104
Epoch 668 - RMSE: 0.7246698555771829, R-squared: 0.2653233972192347
Epoch 669 - Training Loss: 0.22478309273719788, Testing Loss: 0.5025965571403503
Epoch 669 - RMSE: 0.7089404787119906, R-squared: 0.2968704256906759
Epoch 670 - Training Loss: 0.24154868721961975, Testing Loss: 0.5173586010932922
Epoch 670 - RMSE: 0.7192764628342686, R-squared: 0.27621843927561307
Epoch 671 - Training Loss: 0.2272634655237198, Testing Loss: 0.5100288987159729
Epoch 671 - RMSE: 0.7141630654197688, R-squared: 0.28647270909135314
Epoch 672 - Training Loss: 0.2333229035139084, Testing Loss: 0.527210533618927
Epoch 672 - RMSE: 0.7260926286323273, R-squared: 0.262435725862217
Epoch 673 - Training Loss: 0.22480125725269318, Testing Loss: 0.49498698115348816
Epoch 673 - RMSE: 0.7035531139934834, R-squared: 0.3075162349597609
Epoch 674 - Training Loss: 0.22682800889015198, Testing Loss: 0.5135127305984497
Epoch 674 - RMSE: 0.716598034927902, R-squared: 0.281598810734061
Epoch 675 - Training Loss: 0.2955301105976105, Testing Loss: 0.5776189565658569
Epoch 675 - RMSE: 0.7600125122552881, R-squared: 0.19191452372176876
Epoch 676 - Training Loss: 0.2278413623571396, Testing Loss: 0.49803584814071655
Epoch 676 - RMSE: 0.7057165702115336, R-squared: 0.303250851925309
Epoch 677 - Training Loss: 0.24738721549510956, Testing Loss: 0.5062299966812134
Epoch 677 - RMSE: 0.7114984204353385, R-squared: 0.29178732140584485
Epoch 678 - Training Loss: 0.250652939081192, Testing Loss: 0.5224765539169312

Epoch 678 - RMSE: 0.722825386247979, R-squared: 0.26905851584652474
Epoch 679 - Training Loss: 0.24105973541736603, Testing Loss: 0.5158546566963196
Epoch 679 - RMSE: 0.7182302330085044, R-squared: 0.2783224734513655
Epoch 680 - Training Loss: 0.24132229387760162, Testing Loss: 0.5174019932746887
Epoch 680 - RMSE: 0.7193065924844866, R-squared: 0.2761578012786077
Epoch 681 - Training Loss: 0.2420560121536255, Testing Loss: 0.5222712159156799
Epoch 681 - RMSE: 0.7226833360763882, R-squared: 0.26934577792340453
Epoch 682 - Training Loss: 0.226946160197258, Testing Loss: 0.49956703186035156
Epoch 682 - RMSE: 0.7068005782463431, R-squared: 0.301108740551865
Epoch 683 - Training Loss: 0.2478240430355072, Testing Loss: 0.5046166777610779
Epoch 683 - RMSE: 0.7103637098478509, R-squared: 0.2940444609595113
Epoch 684 - Training Loss: 0.22831310331821442, Testing Loss: 0.503157377243042
Epoch 684 - RMSE: 0.7093358713828125, R-squared: 0.2960859033911514
Epoch 685 - Training Loss: 0.2504729628562927, Testing Loss: 0.5415211915969849
Epoch 685 - RMSE: 0.7358812268038036, R-squared: 0.24241517956708847
Epoch 686 - Training Loss: 0.24630063772201538, Testing Loss: 0.5187033414840698
Epoch 686 - RMSE: 0.7202106175131431, R-squared: 0.27433720717161525
Epoch 687 - Training Loss: 0.22758740186691284, Testing Loss: 0.4993712306022644
Epoch 687 - RMSE: 0.7066620272799249, R-squared: 0.30138271477208844
Epoch 688 - Training Loss: 0.22832797467708588, Testing Loss: 0.507339358329773
Epoch 688 - RMSE: 0.7122776014943366, R-squared: 0.29023530653485996
Epoch 689 - Training Loss: 0.2313651293516159, Testing Loss: 0.5109587907791138
Epoch 689 - RMSE: 0.7148138334468719, R-squared: 0.2851717392403822
Epoch 690 - Training Loss: 0.2583838701248169, Testing Loss: 0.5423535108566284
Epoch 690 - RMSE: 0.7364465140389191, R-squared: 0.2412508136340401
Epoch 691 - Training Loss: 0.2248479723930359, Testing Loss: 0.5030714273452759
Epoch 691 - RMSE: 0.709275262955414, R-squared: 0.2962061885916838
Epoch 692 - Training Loss: 0.2388830929994583, Testing Loss: 0.5223313570022583
Epoch 692 - RMSE: 0.7227249592585977, R-squared: 0.26926161096369094
Epoch 693 - Training Loss: 0.22831502556800842, Testing Loss: 0.5123669505119324
Epoch 693 - RMSE: 0.7157980645037987, R-squared: 0.2832018821759875
Epoch 694 - Training Loss: 0.22859503328800201, Testing Loss: 0.519166886806488
Epoch 694 - RMSE: 0.7205323774159639, R-squared: 0.27368867092232474
Epoch 695 - Training Loss: 0.2266949564218521, Testing Loss: 0.5065023303031921
Epoch 695 - RMSE: 0.7116897590368138, R-squared: 0.2914063602110697
Epoch 696 - Training Loss: 0.2282569259405136, Testing Loss: 0.5068093538284302
Epoch 696 - RMSE: 0.711905408104539, R-squared: 0.2909768733258645
Epoch 697 - Training Loss: 0.229291170835495, Testing Loss: 0.528473436832428
Epoch 697 - RMSE: 0.7269617670416464, R-squared: 0.26066892894722504
Epoch 698 - Training Loss: 0.2236257940530777, Testing Loss: 0.5054553747177124
Epoch 698 - RMSE: 0.7109538385038309, R-squared: 0.2928710405467495
Epoch 699 - Training Loss: 0.23727774620056152, Testing Loss: 0.5210345983505249
Epoch 699 - RMSE: 0.7218272823037127, R-squared: 0.27107574405574664
Epoch 700 - Training Loss: 0.2591763734817505, Testing Loss: 0.5414279699325562
Epoch 700 - RMSE: 0.7358179011434002, R-squared: 0.24254556064792687
Epoch 701 - Training Loss: 0.24389435350894928, Testing Loss: 0.5194777250289917
Epoch 701 - RMSE: 0.7207480122525549, R-squared: 0.27325387724662453
Epoch 702 - Training Loss: 0.22871537506580353, Testing Loss: 0.5048843026161194
Epoch 702 - RMSE: 0.7105521382260471, R-squared: 0.2936698931207594
Epoch 703 - Training Loss: 0.22288878262043, Testing Loss: 0.5042924880981445
Epoch 703 - RMSE: 0.7101355151779275, R-squared: 0.2944979453201132
Epoch 704 - Training Loss: 0.2662349045276642, Testing Loss: 0.5570994019508362
Epoch 704 - RMSE: 0.7463909199071598, R-squared: 0.22062133752195945
Epoch 705 - Training Loss: 0.2196117788553238, Testing Loss: 0.5051752924919128
Epoch 705 - RMSE: 0.7107568110065254, R-squared: 0.29326292124593234
Epoch 706 - Training Loss: 0.24336829781532288, Testing Loss: 0.516389012336731
Epoch 706 - RMSE: 0.7186020879155427, R-squared: 0.27757500060188633
Epoch 707 - Training Loss: 0.22564716637134552, Testing Loss: 0.511272132396698
Epoch 707 - RMSE: 0.7150329536582071, R-squared: 0.28473342280174074
Epoch 708 - Training Loss: 0.2352226972579956, Testing Loss: 0.5092816948890686
Epoch 708 - RMSE: 0.713639761919065, R-squared: 0.2875180012546439
Epoch 709 - Training Loss: 0.22000844776630402, Testing Loss: 0.49300843477249146
Epoch 709 - RMSE: 0.7021455994101751, R-squared: 0.31028420233783693
Epoch 710 - Training Loss: 0.2409268617630005, Testing Loss: 0.5277833342552185
Epoch 710 - RMSE: 0.7264869590661478, R-squared: 0.2616343872855096
Epoch 711 - Training Loss: 0.22911199927330017, Testing Loss: 0.5150651335716248
Epoch 711 - RMSE: 0.7176803820667632, R-squared: 0.27942703061363816
Epoch 712 - Training Loss: 0.23684121668338776, Testing Loss: 0.5240045189857483
Epoch 712 - RMSE: 0.7238815457893325, R-squared: 0.2669209184785376
Epoch 713 - Training Loss: 0.22243686020374298, Testing Loss: 0.5106704235076904
Epoch 713 - RMSE: 0.7146120616165368, R-squared: 0.28557523409024177
Epoch 714 - Training Loss: 0.22959072887897491, Testing Loss: 0.511667788028717

Epoch 714 - RMSE: 0.7153095875763904, R-squared: 0.2841798671356734
Epoch 715 - Training Loss: 0.24289321899414062, Testing Loss: 0.5368810892105103
Epoch 715 - RMSE: 0.7327217253329043, R-squared: 0.24890658561154488
Epoch 716 - Training Loss: 0.2501639723777771, Testing Loss: 0.525512158870697
Epoch 716 - RMSE: 0.7249221945263158, R-squared: 0.26481166129541245
Epoch 717 - Training Loss: 0.25050100684165955, Testing Loss: 0.5269414186477661
Epoch 717 - RMSE: 0.7259073270586879, R-squared: 0.2628121361869812
Epoch 718 - Training Loss: 0.2296016961336136, Testing Loss: 0.5159291625022888
Epoch 718 - RMSE: 0.7182820954832974, R-squared: 0.27821824688968066
Epoch 719 - Training Loss: 0.21878407895565033, Testing Loss: 0.4969627559185028
Epoch 719 - RMSE: 0.7049558905398502, R-squared: 0.304752070105754
Epoch 720 - Training Loss: 0.23159228265285492, Testing Loss: 0.5169950723648071
Epoch 720 - RMSE: 0.7190237068652748, R-squared: 0.276727028048671
Epoch 721 - Training Loss: 0.23065908253192902, Testing Loss: 0.520863950252533
Epoch 721 - RMSE: 0.7217090418766241, R-squared: 0.27131453042008136
Epoch 722 - Training Loss: 0.22934415936470032, Testing Loss: 0.5030763745307922
Epoch 722 - RMSE: 0.7092787279671754, R-squared: 0.2961993121082698
Epoch 723 - Training Loss: 0.22790956497192383, Testing Loss: 0.5264065265655518
Epoch 723 - RMSE: 0.7255387700569744, R-squared: 0.26356051484663445
Epoch 724 - Training Loss: 0.2281961739063263, Testing Loss: 0.5022114515304565
Epoch 724 - RMSE: 0.7086687855371123, R-squared: 0.29740925484788927
Epoch 725 - Training Loss: 0.22326263785362244, Testing Loss: 0.5148009061813354
Epoch 725 - RMSE: 0.7174962288662259, R-squared: 0.27979677401838077
Epoch 726 - Training Loss: 0.2311733216047287, Testing Loss: 0.530383288860321
Epoch 726 - RMSE: 0.7282741556706266, R-squared: 0.25799708134874677
Epoch 727 - Training Loss: 0.235889732837677, Testing Loss: 0.5294157266616821
Epoch 727 - RMSE: 0.7276096206660975, R-squared: 0.2593505879734097
Epoch 728 - Training Loss: 0.22807298600673676, Testing Loss: 0.4986235201358795
Epoch 728 - RMSE: 0.7061327905408913, R-squared: 0.3024287465896669
Epoch 729 - Training Loss: 0.21926330029964447, Testing Loss: 0.5092300772666931
Epoch 729 - RMSE: 0.713603600145497, R-squared: 0.2875902056392887
Epoch 730 - Training Loss: 0.2169041484594345, Testing Loss: 0.504712700843811
Epoch 730 - RMSE: 0.7104313446005273, R-squared: 0.2939100244711097
Epoch 731 - Training Loss: 0.22457677125930786, Testing Loss: 0.5148079991340637
Epoch 731 - RMSE: 0.7175012517867599, R-squared: 0.27978669024068425
Epoch 732 - Training Loss: 0.2372589111328125, Testing Loss: 0.5328471660614014
Epoch 732 - RMSE: 0.7299637888988074, R-squared: 0.25455011809781136
Epoch 733 - Training Loss: 0.23560486733913422, Testing Loss: 0.5258645415306091
Epoch 733 - RMSE: 0.7251651745315207, R-squared: 0.26431873666045325
Epoch 734 - Training Loss: 0.22051697969436646, Testing Loss: 0.5025402903556824
Epoch 734 - RMSE: 0.7089007728937798, R-squared: 0.29694918421577
Epoch 735 - Training Loss: 0.22571970522403717, Testing Loss: 0.5148388147354126
Epoch 735 - RMSE: 0.7175226724913503, R-squared: 0.27974368625483104
Epoch 736 - Training Loss: 0.22265274822711945, Testing Loss: 0.5257640480995178
Epoch 736 - RMSE: 0.7250958679167439, R-squared: 0.26445935329008585
Epoch 737 - Training Loss: 0.23251481354236603, Testing Loss: 0.5257817506790161
Epoch 737 - RMSE: 0.7251081123852567, R-squared: 0.264434511387848
Epoch 738 - Training Loss: 0.21395237743854523, Testing Loss: 0.507767915725708
Epoch 738 - RMSE: 0.7125783628540631, R-squared: 0.2896357794320116
Epoch 739 - Training Loss: 0.23986957967281342, Testing Loss: 0.5455942749977112
Epoch 739 - RMSE: 0.7386435254041548, R-squared: 0.23671696882069648
Epoch 740 - Training Loss: 0.23337210714817047, Testing Loss: 0.5175050497055054
Epoch 740 - RMSE: 0.7193782753240485, R-squared: 0.2760135244148716
Epoch 741 - Training Loss: 0.23964917659759521, Testing Loss: 0.535938560962677
Epoch 741 - RMSE: 0.732078249784377, R-squared: 0.25022522544112313
Epoch 742 - Training Loss: 0.22755862772464752, Testing Loss: 0.514315128326416
Epoch 742 - RMSE: 0.7171576866675384, R-squared: 0.28047625260573616
Epoch 743 - Training Loss: 0.2229921668767929, Testing Loss: 0.5200591683387756
Epoch 743 - RMSE: 0.7211512488846357, R-squared: 0.2724404649848988
Epoch 744 - Training Loss: 0.23309335112571716, Testing Loss: 0.5362820625305176
Epoch 744 - RMSE: 0.7323128216186505, R-squared: 0.24974466418628005
Epoch 745 - Training Loss: 0.26313358545303345, Testing Loss: 0.5444905161857605
Epoch 745 - RMSE: 0.737896027085939, R-squared: 0.2382610535280203
Epoch 746 - Training Loss: 0.22037991881370544, Testing Loss: 0.4964925944805145
Epoch 746 - RMSE: 0.7046222937078516, R-squared: 0.3054099201438102
Epoch 747 - Training Loss: 0.23408040404319763, Testing Loss: 0.5110990405082703
Epoch 747 - RMSE: 0.714911921846358, R-squared: 0.2849755450217242
Epoch 748 - Training Loss: 0.23586861789226532, Testing Loss: 0.5210411548614502
Epoch 748 - RMSE: 0.7218318210333013, R-squared: 0.2710665773185763
Epoch 749 - Training Loss: 0.2232791632413864, Testing Loss: 0.5082153677940369
Epoch 749 - RMSE: 0.7128922626860459, R-squared: 0.2890097926365116
Epoch 750 - Training Loss: 0.231277197599411, Testing Loss: 0.49528178572654724

Epoch 750 - RMSE: 0.7037626324202234, R-squared: 0.30710372960725996
Epoch 751 - Training Loss: 0.2151939421892166, Testing Loss: 0.5173792243003845
Epoch 751 - RMSE: 0.7192907719809403, R-squared: 0.27618964144873326
Epoch 752 - Training Loss: 0.21382293105125427, Testing Loss: 0.5046863555908203
Epoch 752 - RMSE: 0.7104127930280815, R-squared: 0.29394690040121896
Epoch 753 - Training Loss: 0.23298947513103485, Testing Loss: 0.532835066318512
Epoch 753 - RMSE: 0.7299555516850225, R-squared: 0.2545669419334343
Epoch 754 - Training Loss: 0.22169159352779388, Testing Loss: 0.5105865597724915
Epoch 754 - RMSE: 0.714553380154814, R-squared: 0.285692561436086
Epoch 755 - Training Loss: 0.23100776970386505, Testing Loss: 0.5321435332298279
Epoch 755 - RMSE: 0.7294816835214367, R-squared: 0.25553445930446095
Epoch 756 - Training Loss: 0.21945108473300934, Testing Loss: 0.5178295969963074
Epoch 756 - RMSE: 0.7196037335435471, R-squared: 0.27555964837819136
Epoch 757 - Training Loss: 0.2149103581905365, Testing Loss: 0.5044906735420227
Epoch 757 - RMSE: 0.7102750405357584, R-squared: 0.2942206881074305
Epoch 758 - Training Loss: 0.22090555727481842, Testing Loss: 0.5197629928588867
Epoch 758 - RMSE: 0.7209458950348367, R-squared: 0.27285476331478786
Epoch 759 - Training Loss: 0.2267937958240509, Testing Loss: 0.511105477809906
Epoch 759 - RMSE: 0.7149164550988686, R-squared: 0.28496647706080935
Epoch 760 - Training Loss: 0.22359751164913177, Testing Loss: 0.5285378694534302
Epoch 760 - RMSE: 0.7270061063718295, R-squared: 0.2605787386630203
Epoch 761 - Training Loss: 0.2186708003282547, Testing Loss: 0.5187504887580872
Epoch 761 - RMSE: 0.7202433874541084, R-squared: 0.27427116963397624
Epoch 762 - Training Loss: 0.22660964727401733, Testing Loss: 0.5254308581352234
Epoch 762 - RMSE: 0.7248661079742594, R-squared: 0.2649254185626515
Epoch 763 - Training Loss: 0.21352049708366394, Testing Loss: 0.5076833367347717
Epoch 763 - RMSE: 0.7125190314940636, R-squared: 0.28975406851532426
Epoch 764 - Training Loss: 0.22314034402370453, Testing Loss: 0.5220111012458801
Epoch 764 - RMSE: 0.7225033583750566, R-squared: 0.2697096581629853
Epoch 765 - Training Loss: 0.22221462428569794, Testing Loss: 0.5142126679420471
Epoch 765 - RMSE: 0.717086259294779, R-squared: 0.280619571522953
Epoch 766 - Training Loss: 0.22592227160930634, Testing Loss: 0.5236963629722595
Epoch 766 - RMSE: 0.723668684538947, R-squared: 0.2673519867604275
Epoch 767 - Training Loss: 0.22418121993541718, Testing Loss: 0.5238650441169739
Epoch 767 - RMSE: 0.7237851887003773, R-squared: 0.2671160682660987
Epoch 768 - Training Loss: 0.21568083763122559, Testing Loss: 0.5201514363288879
Epoch 768 - RMSE: 0.7212152558668143, R-squared: 0.27231130773275913
Epoch 769 - Training Loss: 0.2170579731464386, Testing Loss: 0.5120570659637451
Epoch 769 - RMSE: 0.71558163850291, R-squared: 0.283635273393286
Epoch 770 - Training Loss: 0.2166483849287033, Testing Loss: 0.5202499628067017
Epoch 770 - RMSE: 0.7212835311650044, R-squared: 0.2721735249730953
Epoch 771 - Training Loss: 0.22171343863010406, Testing Loss: 0.5012413859367371
Epoch 771 - RMSE: 0.7079840463871072, R-squared: 0.29876633159874355
Epoch 772 - Training Loss: 0.22782529890537262, Testing Loss: 0.5158323645591736
Epoch 772 - RMSE: 0.7182147258639527, R-squared: 0.27835363626350196
Epoch 773 - Training Loss: 0.22816428542137146, Testing Loss: 0.5306269526481628
Epoch 773 - RMSE: 0.7284414459462999, R-squared: 0.2576561544364111
Epoch 774 - Training Loss: 0.22083830833435059, Testing Loss: 0.5308030247688293
Epoch 774 - RMSE: 0.7285623245708118, R-squared: 0.25740976277728866
Epoch 775 - Training Loss: 0.23046472668647766, Testing Loss: 0.5276104807853699
Epoch 775 - RMSE: 0.7263679854170855, R-squared: 0.26187620541343437
Epoch 776 - Training Loss: 0.22716662287712097, Testing Loss: 0.5233853459358215
Epoch 776 - RMSE: 0.7234537616905979, R-squared: 0.26778710138875206
Epoch 777 - Training Loss: 0.22027108073234558, Testing Loss: 0.5321635603904724
Epoch 777 - RMSE: 0.72949542683665, R-squared: 0.2555064078229733
Epoch 778 - Training Loss: 0.22534587979316711, Testing Loss: 0.5219888091087341
Epoch 778 - RMSE: 0.7224879405987795, R-squared: 0.2697408257218413
Epoch 779 - Training Loss: 0.2269022911787033, Testing Loss: 0.5359584093093872
Epoch 779 - RMSE: 0.7320918065872715, R-squared: 0.25019745616112654
Epoch 780 - Training Loss: 0.2268289029598236, Testing Loss: 0.5302051305770874
Epoch 780 - RMSE: 0.7281518484659183, R-squared: 0.25824628607923383
Epoch 781 - Training Loss: 0.2282029241323471, Testing Loss: 0.5357735753059387
Epoch 781 - RMSE: 0.73196551889814, R-squared: 0.2504561195214059
Epoch 782 - Training Loss: 0.2155921906232834, Testing Loss: 0.5219884514808655
Epoch 782 - RMSE: 0.7224876848806471, R-squared: 0.26974134265913174
Epoch 783 - Training Loss: 0.21296989917755127, Testing Loss: 0.521898627281189
Epoch 783 - RMSE: 0.7224255354100709, R-squared: 0.26986697313792396
Epoch 784 - Training Loss: 0.24741284549236298, Testing Loss: 0.5545963048934937
Epoch 784 - RMSE: 0.7447122734542121, R-squared: 0.22412306830686957
Epoch 785 - Training Loss: 0.22130267322063446, Testing Loss: 0.5165818929672241
Epoch 785 - RMSE: 0.7187363219341276, R-squared: 0.2773050791258943
Epoch 786 - Training Loss: 0.2365138977766037, Testing Loss: 0.5361484885215759

Epoch 786 - RMSE: 0.7322216050617222, R-squared: 0.243923155548292056
Epoch 787 - Training Loss: 0.2372526079416275, Testing Loss: 0.5446507334709167
Epoch 787 - RMSE: 0.7380045963045576, R-squared: 0.2380368824165171
Epoch 788 - Training Loss: 0.21646873652935028, Testing Loss: 0.516639769077301
Epoch 788 - RMSE: 0.718776576399943, R-squared: 0.2772241245065913
Epoch 789 - Training Loss: 0.21779753267765045, Testing Loss: 0.5234377980232239
Epoch 789 - RMSE: 0.7234899973166207, R-squared: 0.2677137508620785
Epoch 790 - Training Loss: 0.2437785416841507, Testing Loss: 0.5389953851699829
Epoch 790 - RMSE: 0.7341630346366637, R-squared: 0.2459487842576512
Epoch 791 - Training Loss: 0.2366379350423813, Testing Loss: 0.5332657694816589
Epoch 791 - RMSE: 0.7302504314434604, R-squared: 0.2539645558881971
Epoch 792 - Training Loss: 0.21112573146820068, Testing Loss: 0.5154456496238708
Epoch 792 - RMSE: 0.7179454368937616, R-squared: 0.27889468608500767
Epoch 793 - Training Loss: 0.21069833636283875, Testing Loss: 0.5114275813102722
Epoch 793 - RMSE: 0.7151416046105795, R-squared: 0.2845160333825302
Epoch 794 - Training Loss: 0.21681064367294312, Testing Loss: 0.5140883922576904
Epoch 794 - RMSE: 0.7169996185795339, R-squared: 0.2807933968298365
Epoch 795 - Training Loss: 0.22731906175613403, Testing Loss: 0.533728837966919
Epoch 795 - RMSE: 0.7305674718910424, R-squared: 0.25331662815106415
Epoch 796 - Training Loss: 0.2203087955713272, Testing Loss: 0.5366076827049255
Epoch 796 - RMSE: 0.7325350888294578, R-squared: 0.2492891690412289
Epoch 797 - Training Loss: 0.2124045044183731, Testing Loss: 0.5244890451431274
Epoch 797 - RMSE: 0.7242161620931977, R-squared: 0.2662430260540454
Epoch 798 - Training Loss: 0.228524848818779, Testing Loss: 0.5347204804420471
Epoch 798 - RMSE: 0.7312458488366662, R-squared: 0.25192930123574586
Epoch 799 - Training Loss: 0.22608183324337006, Testing Loss: 0.5303133726119995
Epoch 799 - RMSE: 0.7282261871334753, R-squared: 0.2580948237225885
Epoch 800 - Training Loss: 0.2113589346408844, Testing Loss: 0.5254924893379211
Epoch 800 - RMSE: 0.7249085794748263, R-squared: 0.2648392767641182
Epoch 801 - Training Loss: 0.22086766362190247, Testing Loss: 0.5286114811897278
Epoch 801 - RMSE: 0.7270567423996449, R-squared: 0.2604757335874789
Epoch 802 - Training Loss: 0.22599327564239502, Testing Loss: 0.5360763669013977
Epoch 802 - RMSE: 0.7321723618600876, R-squared: 0.2500324389569938
Epoch 803 - Training Loss: 0.22501666843891144, Testing Loss: 0.5128044486045837
Epoch 803 - RMSE: 0.7161036119454117, R-squared: 0.2825898029129835
Epoch 804 - Training Loss: 0.22972364723682404, Testing Loss: 0.5404617786407471
Epoch 804 - RMSE: 0.7351610527893687, R-squared: 0.2438972826779403
Epoch 805 - Training Loss: 0.2397366464138031, Testing Loss: 0.5510166883468628
Epoch 805 - RMSE: 0.7423049980749928, R-squared: 0.22913099085695654
Epoch 806 - Training Loss: 0.22941531240940094, Testing Loss: 0.5410013794898987
Epoch 806 - RMSE: 0.7355279433411185, R-squared: 0.24314241090217747
Epoch 807 - Training Loss: 0.21556447446346283, Testing Loss: 0.5269482135772705
Epoch 807 - RMSE: 0.7259119576797503, R-squared: 0.26280273099596074
Epoch 808 - Training Loss: 0.22234733402729034, Testing Loss: 0.5347808599472046
Epoch 808 - RMSE: 0.7312871220506064, R-squared: 0.2518448531575026
Epoch 809 - Training Loss: 0.21735970675945282, Testing Loss: 0.526408851146698
Epoch 809 - RMSE: 0.7255404251374616, R-squared: 0.2635571549489628
Epoch 810 - Training Loss: 0.21580515801906586, Testing Loss: 0.526724100112915
Epoch 810 - RMSE: 0.7257576664302734, R-squared: 0.2631160775350293
Epoch 811 - Training Loss: 0.22008882462978363, Testing Loss: 0.5453392863273621
Epoch 811 - RMSE: 0.7384709135615043, R-squared: 0.23707366671779007
Epoch 812 - Training Loss: 0.22619599103927612, Testing Loss: 0.537314236164093
Epoch 812 - RMSE: 0.733017246214318, R-squared: 0.24830060235400353
Epoch 813 - Training Loss: 0.225009486079216, Testing Loss: 0.5308089256286621
Epoch 813 - RMSE: 0.7285663753503233, R-squared: 0.2574015052059615
Epoch 814 - Training Loss: 0.21824802458286285, Testing Loss: 0.5274763703346252
Epoch 814 - RMSE: 0.7262756946666009, R-squared: 0.2620637623339026
Epoch 815 - Training Loss: 0.21830174326896667, Testing Loss: 0.5088368058204651
Epoch 815 - RMSE: 0.713327971520845, R-squared: 0.28814043439302783
Epoch 816 - Training Loss: 0.21115583181381226, Testing Loss: 0.5264723300933838
Epoch 816 - RMSE: 0.7255841011644846, R-squared: 0.26346848762012265
Epoch 817 - Training Loss: 0.21659336984157562, Testing Loss: 0.5234859585762024
Epoch 817 - RMSE: 0.7235233062602918, R-squared: 0.2676463214767334
Epoch 818 - Training Loss: 0.21476256847381592, Testing Loss: 0.5257242321968079
Epoch 818 - RMSE: 0.7250684197897628, R-squared: 0.26451503925338493
Epoch 819 - Training Loss: 0.21675671637058258, Testing Loss: 0.5198405385017395
Epoch 819 - RMSE: 0.720999663062959, R-squared: 0.27274629852225785
Epoch 820 - Training Loss: 0.21316978335380554, Testing Loss: 0.5267631411552429
Epoch 820 - RMSE: 0.7257845199156285, R-squared: 0.2630615461986948
Epoch 821 - Training Loss: 0.2216719090938568, Testing Loss: 0.523122251033783
Epoch 821 - RMSE: 0.7232718760568357, R-squared: 0.2681552306948711
Epoch 822 - Training Loss: 0.21023070812225342, Testing Loss: 0.5221119523048401

Epoch 822 - RMSE: 0.7225731415314877, R-squared: 0.2695685808222079
Epoch 823 - Training Loss: 0.21517348289489746, Testing Loss: 0.5342423915863037
Epoch 823 - RMSE: 0.7309188302400198, R-squared: 0.25259823721571384
Epoch 824 - Training Loss: 0.21699805557727814, Testing Loss: 0.5293020606040955
Epoch 824 - RMSE: 0.7275314631720269, R-squared: 0.2595096958008781
Epoch 825 - Training Loss: 0.2276967167854309, Testing Loss: 0.5503987669944763
Epoch 825 - RMSE: 0.7418886756755417, R-squared: 0.22999543347673435
Epoch 826 - Training Loss: 0.21907658874988556, Testing Loss: 0.5251126885414124
Epoch 826 - RMSE: 0.7246465810807122, R-squared: 0.2653705882353248
Epoch 827 - Training Loss: 0.24450886249542236, Testing Loss: 0.5491939187049866
Epoch 827 - RMSE: 0.7410761723126912, R-squared: 0.2316811006935069
Epoch 828 - Training Loss: 0.2318497598171234, Testing Loss: 0.5445181727409363
Epoch 828 - RMSE: 0.7379147266662386, R-squared: 0.23822244543538817
Epoch 829 - Training Loss: 0.25857439637184143, Testing Loss: 0.5735683441162109
Epoch 829 - RMSE: 0.7573429422111261, R-squared: 0.19758140960776405
Epoch 830 - Training Loss: 0.26308366656303406, Testing Loss: 0.5800961256027222
Epoch 830 - RMSE: 0.7616404290041313, R-squared: 0.18844904195620482
Epoch 831 - Training Loss: 0.2192731350660324, Testing Loss: 0.5428439378738403
Epoch 831 - RMSE: 0.7367794571223212, R-squared: 0.24056460657653922
Epoch 832 - Training Loss: 0.20444707572460175, Testing Loss: 0.5260369777679443
Epoch 832 - RMSE: 0.7252840453492302, R-squared: 0.26407752761178405
Epoch 833 - Training Loss: 0.21256765723228455, Testing Loss: 0.5429715514183044
Epoch 833 - RMSE: 0.736866050009713, R-squared: 0.24038608485658886
Epoch 834 - Training Loss: 0.21691159904003143, Testing Loss: 0.5360355973243713
Epoch 834 - RMSE: 0.732144559932383, R-squared: 0.25008939316376877
Epoch 835 - Training Loss: 0.21976423263549805, Testing Loss: 0.5216224789619446
Epoch 835 - RMSE: 0.7222344146073268, R-squared: 0.2702532417425949
Epoch 836 - Training Loss: 0.21042846143245697, Testing Loss: 0.530306339263916
Epoch 836 - RMSE: 0.7282213628674924, R-squared: 0.2581046534598662
Epoch 837 - Training Loss: 0.2094169706106186, Testing Loss: 0.5307385325431824
Epoch 837 - RMSE: 0.7285180370176733, R-squared: 0.2575000405858051
Epoch 838 - Training Loss: 0.2118084579706192, Testing Loss: 0.5323669910430908
Epoch 838 - RMSE: 0.7296348076762609, R-squared: 0.25522188772494314
Epoch 839 - Training Loss: 0.20273630321025848, Testing Loss: 0.5268458127975464
Epoch 839 - RMSE: 0.7258414310720105, R-squared: 0.2629459701213198
Epoch 840 - Training Loss: 0.2035728543996811, Testing Loss: 0.5303477048873901
Epoch 840 - RMSE: 0.7282497824736481, R-squared: 0.25804674583437637
Epoch 841 - Training Loss: 0.22278223931789398, Testing Loss: 0.534782350063324
Epoch 841 - RMSE: 0.7312881532657369, R-squared: 0.25184274315329735
Epoch 842 - Training Loss: 0.2156917303800583, Testing Loss: 0.5344534516334534
Epoch 842 - RMSE: 0.7310632116936059, R-squared: 0.2523029332598995
Epoch 843 - Training Loss: 0.2086462825536728, Testing Loss: 0.5325459241867065
Epoch 843 - RMSE: 0.7297574445386414, R-squared: 0.2549715023927993
Epoch 844 - Training Loss: 0.21995896100997925, Testing Loss: 0.5449617505073547
Epoch 844 - RMSE: 0.7382152533415582, R-squared: 0.23760182875433922
Epoch 845 - Training Loss: 0.21415694057941437, Testing Loss: 0.5223074555397034
Epoch 845 - RMSE: 0.7227084239263503, R-squared: 0.26929504792658954
Epoch 846 - Training Loss: 0.2191600203514099, Testing Loss: 0.5385664701461792
Epoch 846 - RMSE: 0.7338708495189421, R-squared: 0.2465488654124558
Epoch 847 - Training Loss: 0.22259919345378876, Testing Loss: 0.5460374355316162
Epoch 847 - RMSE: 0.7389434843449431, R-squared: 0.23609691313740588
Epoch 848 - Training Loss: 0.2156464010477066, Testing Loss: 0.5401504635810852
Epoch 848 - RMSE: 0.7349493100889516, R-squared: 0.2443327686833131
Epoch 849 - Training Loss: 0.21836087107658386, Testing Loss: 0.5455546975135803
Epoch 849 - RMSE: 0.7386167303055059, R-squared: 0.2367723456633829
Epoch 850 - Training Loss: 0.21983326971530914, Testing Loss: 0.5422286987304688
Epoch 850 - RMSE: 0.7363618238852802, R-squared: 0.24142531344937057
Epoch 851 - Training Loss: 0.23197145760059357, Testing Loss: 0.5457155704498291
Epoch 851 - RMSE: 0.7387256448355434, R-squared: 0.23654724188035425
Epoch 852 - Training Loss: 0.21180720627307892, Testing Loss: 0.5334151387214661
Epoch 852 - RMSE: 0.7303527683945258, R-squared: 0.25375544312614917
Epoch 853 - Training Loss: 0.2004457712173462, Testing Loss: 0.525229811668396
Epoch 853 - RMSE: 0.7247274259859348, R-squared: 0.26520666182019337
Epoch 854 - Training Loss: 0.20428608357906342, Testing Loss: 0.5265466570854187
Epoch 854 - RMSE: 0.7256353065774876, R-squared: 0.2633645279798884
Epoch 855 - Training Loss: 0.21906428039073944, Testing Loss: 0.5546786785125732
Epoch 855 - RMSE: 0.744767499180511, R-squared: 0.2240079904241632
Epoch 856 - Training Loss: 0.21192584931850433, Testing Loss: 0.5303320288658142
Epoch 856 - RMSE: 0.7282390001097909, R-squared: 0.2580687161827937
Epoch 857 - Training Loss: 0.20588208734989166, Testing Loss: 0.5324329733848572
Epoch 857 - RMSE: 0.7296800468473964, R-squared: 0.25512952867448657
Epoch 858 - Training Loss: 0.2076701819896698, Testing Loss: 0.534320592880249

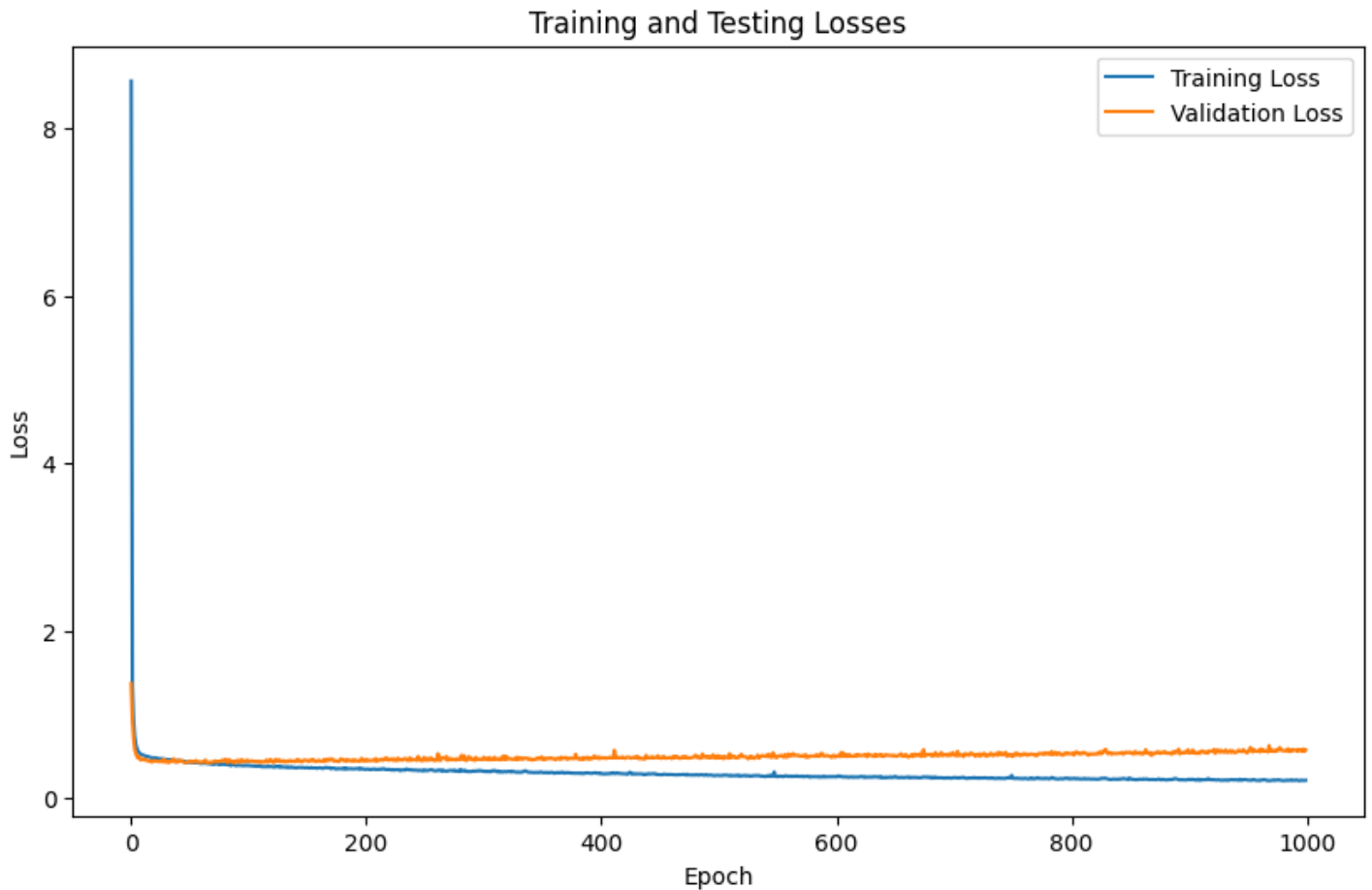
Epoch 858 - RMSE: 0.730972324802081, R-squared: 0.2524888313790312
Epoch 859 - Training Loss: 0.2329188883304596, Testing Loss: 0.5444985628128052
Epoch 859 - RMSE: 0.7379014762042477, R-squared: 0.2382498031057022
Epoch 860 - Training Loss: 0.20476751029491425, Testing Loss: 0.5252813696861267
Epoch 860 - RMSE: 0.7247629881233421, R-squared: 0.26513454791409086
Epoch 861 - Training Loss: 0.21257637441158295, Testing Loss: 0.5325464606285095
Epoch 861 - RMSE: 0.7297578176568266, R-squared: 0.25497074054033975
Epoch 862 - Training Loss: 0.21456296741962433, Testing Loss: 0.5245527029037476
Epoch 862 - RMSE: 0.7242601556614854, R-squared: 0.26615387706871385
Epoch 863 - Training Loss: 0.21854041516780853, Testing Loss: 0.5446749925613403
Epoch 863 - RMSE: 0.7380209610248533, R-squared: 0.23800309007536824
Epoch 864 - Training Loss: 0.23723119497299194, Testing Loss: 0.5761795043945312
Epoch 864 - RMSE: 0.759064905597415, R-squared: 0.19392835845923828
Epoch 865 - Training Loss: 0.20941857993602753, Testing Loss: 0.5396366715431213
Epoch 865 - RMSE: 0.7345996902212153, R-squared: 0.24505154869698131
Epoch 866 - Training Loss: 0.20739610493183136, Testing Loss: 0.5321865677833557
Epoch 866 - RMSE: 0.7295111643375364, R-squared: 0.25547428535992234
Epoch 867 - Training Loss: 0.2189442217350006, Testing Loss: 0.5288329720497131
Epoch 867 - RMSE: 0.7272090192915399, R-squared: 0.26016592489403434
Epoch 868 - Training Loss: 0.20717602968215942, Testing Loss: 0.5423109531402588
Epoch 868 - RMSE: 0.7364176337835907, R-squared: 0.24131032220703386
Epoch 869 - Training Loss: 0.21129775047302246, Testing Loss: 0.5079295039176941
Epoch 869 - RMSE: 0.7126917631983707, R-squared: 0.28940966547392366
Epoch 870 - Training Loss: 0.20668163895606995, Testing Loss: 0.5285382270812988
Epoch 870 - RMSE: 0.7270063159346181, R-squared: 0.2605783123799328
Epoch 871 - Training Loss: 0.212460458278656, Testing Loss: 0.5333616733551025
Epoch 871 - RMSE: 0.7303161575814288, R-squared: 0.2538302561108339
Epoch 872 - Training Loss: 0.20015716552734375, Testing Loss: 0.5289756655693054
Epoch 872 - RMSE: 0.7273071699601079, R-squared: 0.2599662020974919
Epoch 873 - Training Loss: 0.21823713183403015, Testing Loss: 0.5436581373214722
Epoch 873 - RMSE: 0.7373318064529777, R-squared: 0.23942551166063697
Epoch 874 - Training Loss: 0.2102217823266983, Testing Loss: 0.5466933846473694
Epoch 874 - RMSE: 0.7393871846338486, R-squared: 0.23517926304001113
Epoch 875 - Training Loss: 0.22670479118824005, Testing Loss: 0.5516531467437744
Epoch 875 - RMSE: 0.7427336107753468, R-squared: 0.22824052228276948
Epoch 876 - Training Loss: 0.20403018593788147, Testing Loss: 0.5322663187980652
Epoch 876 - RMSE: 0.7295658391406549, R-squared: 0.2553626809752756
Epoch 877 - Training Loss: 0.20676688849925995, Testing Loss: 0.5336085557937622
Epoch 877 - RMSE: 0.7304851377343825, R-squared: 0.2534849194693948
Epoch 878 - Training Loss: 0.21286767721176147, Testing Loss: 0.5451778173446655
Epoch 878 - RMSE: 0.7383615534025872, R-squared: 0.23729961351045548
Epoch 879 - Training Loss: 0.20555473864078522, Testing Loss: 0.5433585047721863
Epoch 879 - RMSE: 0.7371285706033373, R-squared: 0.2398447386560688
Epoch 880 - Training Loss: 0.20304624736309052, Testing Loss: 0.5542002320289612
Epoch 880 - RMSE: 0.7444462174566976, R-squared: 0.22467734905220194
Epoch 881 - Training Loss: 0.21286743879318237, Testing Loss: 0.5445781350135803
Epoch 881 - RMSE: 0.7379553619282868, R-squared: 0.2381385444594497
Epoch 882 - Training Loss: 0.21328723430633545, Testing Loss: 0.5320862531661987
Epoch 882 - RMSE: 0.7294424086575886, R-squared: 0.2556146203182643
Epoch 883 - Training Loss: 0.20773664116859436, Testing Loss: 0.5374744534492493
Epoch 883 - RMSE: 0.7331265139891532, R-squared: 0.2480764803628186
Epoch 884 - Training Loss: 0.21299797296524048, Testing Loss: 0.5341637134552002
Epoch 884 - RMSE: 0.730865070151059, R-squared: 0.2527081780352224
Epoch 885 - Training Loss: 0.20022638142108917, Testing Loss: 0.5310342907905579
Epoch 885 - RMSE: 0.7287210088151125, R-squared: 0.2570862483725317
Epoch 886 - Training Loss: 0.20914947986602783, Testing Loss: 0.5225964188575745
Epoch 886 - RMSE: 0.7229083278120169, R-squared: 0.268890760509365
Epoch 887 - Training Loss: 0.21880097687244415, Testing Loss: 0.5498547554016113
Epoch 887 - RMSE: 0.7415219363246286, R-squared: 0.23075652118902457
Epoch 888 - Training Loss: 0.21545833349227905, Testing Loss: 0.5321669578552246
Epoch 888 - RMSE: 0.7294977784693106, R-squared: 0.2555016078524609
Epoch 889 - Training Loss: 0.2329910546541214, Testing Loss: 0.5555998086929321
Epoch 889 - RMSE: 0.7453856577998373, R-squared: 0.2227193057808583
Epoch 890 - Training Loss: 0.2131873071193695, Testing Loss: 0.5445669293403625
Epoch 890 - RMSE: 0.7379477865768558, R-squared: 0.23815418588965753
Epoch 891 - Training Loss: 0.22938072681427002, Testing Loss: 0.5562580823898315
Epoch 891 - RMSE: 0.7458270648541686, R-squared: 0.22179844349505995
Epoch 892 - Training Loss: 0.23993432521820068, Testing Loss: 0.5833876729011536
Epoch 892 - RMSE: 0.7637981762866546, R-squared: 0.18384423818099904
Epoch 893 - Training Loss: 0.19733141362667084, Testing Loss: 0.5241464376449585
Epoch 893 - RMSE: 0.7239796039114756, R-squared: 0.2667222969573284
Epoch 894 - Training Loss: 0.2039482295513153, Testing Loss: 0.5426492094993591

Epoch 894 - RMSE: 0.7366472813903203, R-squared: 0.24036706239555902
Epoch 895 - Training Loss: 0.20336966216564178, Testing Loss: 0.5410796999931335
Epoch 895 - RMSE: 0.7355812011475724, R-squared: 0.24303280246464143
Epoch 896 - Training Loss: 0.2034507840871811, Testing Loss: 0.5378322601318359
Epoch 896 - RMSE: 0.7333704909601336, R-squared: 0.2475759322453982
Epoch 897 - Training Loss: 0.2150530368089676, Testing Loss: 0.5488101243972778
Epoch 897 - RMSE: 0.7408171959194803, R-squared: 0.23221800013155658
Epoch 898 - Training Loss: 0.20603448152542114, Testing Loss: 0.539408266544342
Epoch 898 - RMSE: 0.7344441772730074, R-squared: 0.24537115632511763
Epoch 899 - Training Loss: 0.2062399685382843, Testing Loss: 0.5523963570594788
Epoch 899 - RMSE: 0.7432336883492949, R-squared: 0.22720093143359876
Epoch 900 - Training Loss: 0.22940407693386078, Testing Loss: 0.5751597285270691
Epoch 900 - RMSE: 0.7583928513290037, R-squared: 0.19535507195887092
Epoch 901 - Training Loss: 0.20669184625148773, Testing Loss: 0.535897433757782
Epoch 901 - RMSE: 0.73205014715543, R-squared: 0.25028278824363803
Epoch 902 - Training Loss: 0.19673728942871094, Testing Loss: 0.5382661819458008
Epoch 902 - RMSE: 0.7336662551660407, R-squared: 0.24696891305322455
Epoch 903 - Training Loss: 0.20693229138851166, Testing Loss: 0.5417132377624512
Epoch 903 - RMSE: 0.7360117163834339, R-squared: 0.24214647943990475
Epoch 904 - Training Loss: 0.2332633137702942, Testing Loss: 0.571743369102478
Epoch 904 - RMSE: 0.7561371074722025, R-squared: 0.20013458299343134
Epoch 905 - Training Loss: 0.21363405883312225, Testing Loss: 0.5383572578430176
Epoch 905 - RMSE: 0.7337283257148268, R-squared: 0.24684148991030885
Epoch 906 - Training Loss: 0.204423189163208, Testing Loss: 0.5453947186470032
Epoch 906 - RMSE: 0.7385084185053512, R-squared: 0.23699617081276492
Epoch 907 - Training Loss: 0.20031441748142242, Testing Loss: 0.5312702059745789
Epoch 907 - RMSE: 0.7288828646690816, R-squared: 0.2567561953288796
Epoch 908 - Training Loss: 0.1996939778327942, Testing Loss: 0.5326185822486877
Epoch 908 - RMSE: 0.7298072244002328, R-squared: 0.2548698557957956
Epoch 909 - Training Loss: 0.19873470067977905, Testing Loss: 0.5470672845840454
Epoch 909 - RMSE: 0.739639956141685, R-squared: 0.23465624089261683
Epoch 910 - Training Loss: 0.20053279399871826, Testing Loss: 0.5310143828392029
Epoch 910 - RMSE: 0.7287073050815631, R-squared: 0.257114189371225
Epoch 911 - Training Loss: 0.1989157497882843, Testing Loss: 0.5527697801589966
Epoch 911 - RMSE: 0.7434849236745962, R-squared: 0.22667838450537559
Epoch 912 - Training Loss: 0.22719037532806396, Testing Loss: 0.5621154308319092
Epoch 912 - RMSE: 0.7497435924474386, R-squared: 0.21360391549971713
Epoch 913 - Training Loss: 0.20780882239341736, Testing Loss: 0.5539311766624451
Epoch 913 - RMSE: 0.7442655326321516, R-squared: 0.2250536610901619
Epoch 914 - Training Loss: 0.20121558010578156, Testing Loss: 0.5388467907905579
Epoch 914 - RMSE: 0.7340618244163412, R-squared: 0.24615667385595252
Epoch 915 - Training Loss: 0.20360322296619415, Testing Loss: 0.5460678935050964
Epoch 915 - RMSE: 0.7389640322520653, R-squared: 0.2360544286220112
Epoch 916 - Training Loss: 0.20596733689308167, Testing Loss: 0.549701988697052
Epoch 916 - RMSE: 0.7414189281124908, R-squared: 0.23097022462215377
Epoch 917 - Training Loss: 0.20481561124324799, Testing Loss: 0.5348799228668213
Epoch 917 - RMSE: 0.7313548372457417, R-squared: 0.25170629248608
Epoch 918 - Training Loss: 0.20617932081222534, Testing Loss: 0.5626699328422546
Epoch 918 - RMSE: 0.750113268478813, R-squared: 0.21282822776551813
Epoch 919 - Training Loss: 0.21255913376808167, Testing Loss: 0.5567947030067444
Epoch 919 - RMSE: 0.7461867602989114, R-squared: 0.22104764463935755
Epoch 920 - Training Loss: 0.21707195043563843, Testing Loss: 0.5564441680908203
Epoch 920 - RMSE: 0.7459518700360525, R-squared: 0.22153797637711614
Epoch 921 - Training Loss: 0.22205519676208496, Testing Loss: 0.5594857335090637
Epoch 921 - RMSE: 0.7479877641037527, R-squared: 0.2172829324986414
Epoch 922 - Training Loss: 0.22707565128803253, Testing Loss: 0.5794875621795654
Epoch 922 - RMSE: 0.7612408365810722, R-squared: 0.18930037424534296
Epoch 923 - Training Loss: 0.19472196698188782, Testing Loss: 0.5307921171188354
Epoch 923 - RMSE: 0.7285549055436978, R-squared: 0.2574248864499461
Epoch 924 - Training Loss: 0.21722210943698883, Testing Loss: 0.5524659752845764
Epoch 924 - RMSE: 0.7432805360248256, R-squared: 0.2271035058685673
Epoch 925 - Training Loss: 0.21926917135715485, Testing Loss: 0.575973391532898
Epoch 925 - RMSE: 0.7589291132575822, R-squared: 0.19421673581072985
Epoch 926 - Training Loss: 0.21360360085964203, Testing Loss: 0.5552148222923279
Epoch 926 - RMSE: 0.7451274108954189, R-squared: 0.22325780704782328
Epoch 927 - Training Loss: 0.19596844911575317, Testing Loss: 0.5437082052230835
Epoch 927 - RMSE: 0.7373657367996718, R-squared: 0.23935551020503731
Epoch 928 - Training Loss: 0.22110134363174438, Testing Loss: 0.5703997611999512
Epoch 928 - RMSE: 0.7552481635666031, R-squared: 0.20201418265961124
Epoch 929 - Training Loss: 0.21192458271980286, Testing Loss: 0.5499945282936096
Epoch 929 - RMSE: 0.7416161588074698, R-squared: 0.2305610188530356
Epoch 930 - Training Loss: 0.2054872214794159, Testing Loss: 0.5565816760063171

Epoch 930 - RMSE: 0.7460440030058613, R-squared: 0.22134566786442
Epoch 931 - Training Loss: 0.2025884985923767, Testing Loss: 0.5448147654533386
Epoch 931 - RMSE: 0.738115730281361, R-squared: 0.23780738149547642
Epoch 932 - Training Loss: 0.21806611120700836, Testing Loss: 0.5740824937820435
Epoch 932 - RMSE: 0.7576823314163241, R-squared: 0.19686207042134418
Epoch 933 - Training Loss: 0.19938674569129944, Testing Loss: 0.546451985836029
Epoch 933 - RMSE: 0.7392239349022405, R-squared: 0.23551695619734636
Epoch 934 - Training Loss: 0.19981035590171814, Testing Loss: 0.5438746213912964
Epoch 934 - RMSE: 0.7374785261360861, R-squared: 0.23912279218060173
Epoch 935 - Training Loss: 0.21541757881641388, Testing Loss: 0.5501237511634827
Epoch 935 - RMSE: 0.7417032790608524, R-squared: 0.230380230838786
Epoch 936 - Training Loss: 0.2066493183374405, Testing Loss: 0.5675081014633179
Epoch 936 - RMSE: 0.7533313511117665, R-squared: 0.20605960292277015
Epoch 937 - Training Loss: 0.20010370016098022, Testing Loss: 0.543343722820282
Epoch 937 - RMSE: 0.7371185407539455, R-squared: 0.2398654248462928
Epoch 938 - Training Loss: 0.20778319239616394, Testing Loss: 0.5639286041259766
Epoch 938 - RMSE: 0.7509518155414276, R-squared: 0.21106729496998966
Epoch 939 - Training Loss: 0.2030106633901596, Testing Loss: 0.5529099702835083
Epoch 939 - RMSE: 0.7435791648798452, R-squared: 0.22648232570800098
Epoch 940 - Training Loss: 0.20184649527072906, Testing Loss: 0.5401172637939453
Epoch 940 - RMSE: 0.7349266923539398, R-squared: 0.24437927860711084
Epoch 941 - Training Loss: 0.19432668387889862, Testing Loss: 0.5466763973236084
Epoch 941 - RMSE: 0.7393756682387734, R-squared: 0.23520308793001954
Epoch 942 - Training Loss: 0.2031092643737793, Testing Loss: 0.5520640015602112
Epoch 942 - RMSE: 0.7430100955934041, R-squared: 0.22766583576982258
Epoch 943 - Training Loss: 0.23572638630867004, Testing Loss: 0.5713188052177429
Epoch 943 - RMSE: 0.7558563169405372, R-squared: 0.20072853065720797
Epoch 944 - Training Loss: 0.20594391226768494, Testing Loss: 0.5622090101242065
Epoch 944 - RMSE: 0.7498059917119521, R-squared: 0.21347301053489498
Epoch 945 - Training Loss: 0.2000018060207367, Testing Loss: 0.5531816482543945
Epoch 945 - RMSE: 0.7437617987039068, R-squared: 0.2261023047322963
Epoch 946 - Training Loss: 0.20507436990737915, Testing Loss: 0.5528022646903992
Epoch 946 - RMSE: 0.7435067357115293, R-squared: 0.22663300909417328
Epoch 947 - Training Loss: 0.2303592413663864, Testing Loss: 0.5787349939346313
Epoch 947 - RMSE: 0.7607463412147322, R-squared: 0.190353278878844
Epoch 948 - Training Loss: 0.2031245231628418, Testing Loss: 0.5535470843315125
Epoch 948 - RMSE: 0.7440074466002117, R-squared: 0.22559101809437965
Epoch 949 - Training Loss: 0.2039555311203003, Testing Loss: 0.5538311004638672
Epoch 949 - RMSE: 0.7441983240213734, R-squared: 0.22519361306424002
Epoch 950 - Training Loss: 0.20077663660049438, Testing Loss: 0.5386608839035034
Epoch 950 - RMSE: 0.7339352050077007, R-squared: 0.24641671452481817
Epoch 951 - Training Loss: 0.1972542256116867, Testing Loss: 0.5461075901985168
Epoch 951 - RMSE: 0.7389909377693177, R-squared: 0.23599879743011798
Epoch 952 - Training Loss: 0.20637215673923492, Testing Loss: 0.5700643062591553
Epoch 952 - RMSE: 0.7550260235480721, R-squared: 0.20248353438667888
Epoch 953 - Training Loss: 0.24417200684547424, Testing Loss: 0.6035720705986023
Epoch 953 - RMSE: 0.776899004220296, R-squared: 0.1556063738539849
Epoch 954 - Training Loss: 0.20987506210803986, Testing Loss: 0.5686362385749817
Epoch 954 - RMSE: 0.7540797536369767, R-squared: 0.20448132758120874
Epoch 955 - Training Loss: 0.1970273107290268, Testing Loss: 0.5487614274024963
Epoch 955 - RMSE: 0.7407843514691024, R-squared: 0.23228607851559768
Epoch 956 - Training Loss: 0.22557057440280914, Testing Loss: 0.5798711180686951
Epoch 956 - RMSE: 0.7614926688399021, R-squared: 0.18876389727737264
Epoch 957 - Training Loss: 0.2132006287574768, Testing Loss: 0.5597851276397705
Epoch 957 - RMSE: 0.748187860060846, R-squared: 0.2168641035365496
Epoch 958 - Training Loss: 0.20238959789276123, Testing Loss: 0.5556394457817078
Epoch 958 - RMSE: 0.745412210319245, R-squared: 0.22266392739222185
Epoch 959 - Training Loss: 0.20878832042217255, Testing Loss: 0.5587623119354248
Epoch 959 - RMSE: 0.7475040679267295, R-squared: 0.2182949138677085
Epoch 960 - Training Loss: 0.19633199274539948, Testing Loss: 0.570196807384491
Epoch 960 - RMSE: 0.7551137430391022, R-squared: 0.20229821149676241
Epoch 961 - Training Loss: 0.20144206285476685, Testing Loss: 0.5490301251411438
Epoch 961 - RMSE: 0.7409656321150292, R-squared: 0.23191029113845152
Epoch 962 - Training Loss: 0.2162853330373764, Testing Loss: 0.5861715078353882
Epoch 962 - RMSE: 0.7656183922125165, R-squared: 0.17994962331389774
Epoch 963 - Training Loss: 0.20379607379436493, Testing Loss: 0.5586836338043213
Epoch 963 - RMSE: 0.7474514266279366, R-squared: 0.2184050096486555
Epoch 964 - Training Loss: 0.20487143099308014, Testing Loss: 0.5777502655982971
Epoch 964 - RMSE: 0.7600988782601119, R-squared: 0.19173085548351088
Epoch 965 - Training Loss: 0.19671982526779175, Testing Loss: 0.5561082363128662
Epoch 965 - RMSE: 0.7457267098751075, R-squared: 0.22200785168214865
Epoch 966 - Training Loss: 0.19001378118991852, Testing Loss: 0.5577678680419922

Epoch 966 - RMSE: 0.7468385969187102, R-squared: 0.2196861317542398
Epoch 967 - Training Loss: 0.2007063329219818, Testing Loss: 0.5623945593833923
Epoch 967 - RMSE: 0.7499297261447605, R-squared: 0.21321340071045547
Epoch 968 - Training Loss: 0.1922924667596817, Testing Loss: 0.5478179454803467
Epoch 968 - RMSE: 0.740147242778037, R-squared: 0.23360604937887341
Epoch 969 - Training Loss: 0.2438148409128189, Testing Loss: 0.6244098544120789
Epoch 969 - RMSE: 0.7901960858123102, R-squared: 0.12645443124281586
Epoch 970 - Training Loss: 0.20254504680633545, Testing Loss: 0.5589261054992676
Epoch 970 - RMSE: 0.7476136045104274, R-squared: 0.21806580052403046
Epoch 971 - Training Loss: 0.19293606281280518, Testing Loss: 0.5626774430274963
Epoch 971 - RMSE: 0.7501182587276494, R-squared: 0.21281775415772608
Epoch 972 - Training Loss: 0.19796323776245117, Testing Loss: 0.569584846496582
Epoch 972 - RMSE: 0.7547084763065716, R-squared: 0.20315422888015156
Epoch 973 - Training Loss: 0.20058289170265198, Testing Loss: 0.552236020565033
Epoch 973 - RMSE: 0.7431258628023776, R-squared: 0.22742514473047348
Epoch 974 - Training Loss: 0.20669394731521606, Testing Loss: 0.5675628781318665
Epoch 974 - RMSE: 0.7533676734894141, R-squared: 0.2059830403368461
Epoch 975 - Training Loss: 0.19848668575286865, Testing Loss: 0.5554203987121582
Epoch 975 - RMSE: 0.7452652894813618, R-squared: 0.22297032326400856
Epoch 976 - Training Loss: 0.22030222415924072, Testing Loss: 0.5763540267944336
Epoch 976 - RMSE: 0.7591798535507684, R-squared: 0.19368420726635138
Epoch 977 - Training Loss: 0.2065698653459549, Testing Loss: 0.572152853012085
Epoch 977 - RMSE: 0.7564078740445631, R-squared: 0.19956162977536052
Epoch 978 - Training Loss: 0.2300000637769699, Testing Loss: 0.6030022501945496
Epoch 978 - RMSE: 0.7765322108819962, R-squared: 0.1564035040923213
Epoch 979 - Training Loss: 0.20038820803165436, Testing Loss: 0.5681780576705933
Epoch 979 - RMSE: 0.7537758506316802, R-squared: 0.2051224051276802
Epoch 980 - Training Loss: 0.20791839063167572, Testing Loss: 0.5713900327682495
Epoch 980 - RMSE: 0.7559034697618671, R-squared: 0.20062880514194437
Epoch 981 - Training Loss: 0.19265592098236084, Testing Loss: 0.5630971193313599
Epoch 981 - RMSE: 0.7503980218536398, R-squared: 0.21223047173767695
Epoch 982 - Training Loss: 0.213200181722641, Testing Loss: 0.5655954480171204
Epoch 982 - RMSE: 0.7520607648901719, R-squared: 0.20873550117267858
Epoch 983 - Training Loss: 0.20152547955513, Testing Loss: 0.558937132358551
Epoch 983 - RMSE: 0.7476209891574412, R-squared: 0.2180503531417609
Epoch 984 - Training Loss: 0.20520581305027008, Testing Loss: 0.5706780552864075
Epoch 984 - RMSE: 0.7554323158760589, R-squared: 0.20162498913673155
Epoch 985 - Training Loss: 0.20868390798568726, Testing Loss: 0.5862047672271729
Epoch 985 - RMSE: 0.765640108845458, R-squared: 0.17990310148062927
Epoch 986 - Training Loss: 0.19203685224056244, Testing Loss: 0.5530350208282471
Epoch 986 - RMSE: 0.7436632532163773, R-squared: 0.22630736789489492
Epoch 987 - Training Loss: 0.19782881438732147, Testing Loss: 0.5668389201164246
Epoch 987 - RMSE: 0.7528870850380343, R-squared: 0.20699575612155052
Epoch 988 - Training Loss: 0.19689440727233887, Testing Loss: 0.5553058981895447
Epoch 988 - RMSE: 0.7451885171493292, R-squared: 0.22313040399923756
Epoch 989 - Training Loss: 0.201569601893425, Testing Loss: 0.5794094800949097
Epoch 989 - RMSE: 0.7611895157641502, R-squared: 0.1894096809524931
Epoch 990 - Training Loss: 0.20405668020248413, Testing Loss: 0.570297360420227
Epoch 990 - RMSE: 0.7551803647733294, R-squared: 0.20215744695254034
Epoch 991 - Training Loss: 0.20574919879436493, Testing Loss: 0.5698292255401611
Epoch 991 - RMSE: 0.7548703552099033, R-squared: 0.20281235819091747
Epoch 992 - Training Loss: 0.19631412625312805, Testing Loss: 0.5704520344734192
Epoch 992 - RMSE: 0.7552827760196008, R-squared: 0.20194103880879377
Epoch 993 - Training Loss: 0.19946162402629852, Testing Loss: 0.5546741485595703
Epoch 993 - RMSE: 0.7447644492720431, R-squared: 0.22401434596399983
Epoch 994 - Training Loss: 0.20478259027004242, Testing Loss: 0.5808454751968384
Epoch 994 - RMSE: 0.7621322235145991, R-squared: 0.18740065968423691
Epoch 995 - Training Loss: 0.19797180593013763, Testing Loss: 0.5701436400413513
Epoch 995 - RMSE: 0.755078570990849, R-squared: 0.20237252123521932
Epoch 996 - Training Loss: 0.20119279623031616, Testing Loss: 0.5746197700500488
Epoch 996 - RMSE: 0.7580367946110793, R-squared: 0.19611043767104563
Epoch 997 - Training Loss: 0.19299349188804626, Testing Loss: 0.5558503866195679
Epoch 997 - RMSE: 0.7455537128567065, R-squared: 0.22236877401142507
Epoch 998 - Training Loss: 0.21174223721027374, Testing Loss: 0.5837446451187134
Epoch 998 - RMSE: 0.7640318378216406, R-squared: 0.1833448042096143
Epoch 999 - Training Loss: 0.19118286669254303, Testing Loss: 0.5547677278518677
Epoch 999 - RMSE: 0.7448273421039515, R-squared: 0.22388328171673688
Epoch 1000 - Training Loss: 0.1991530954837799, Testing Loss: 0.5738546848297119
Epoch 1000 - RMSE: 0.7575320009972374, R-squared: 0.19718073717393292

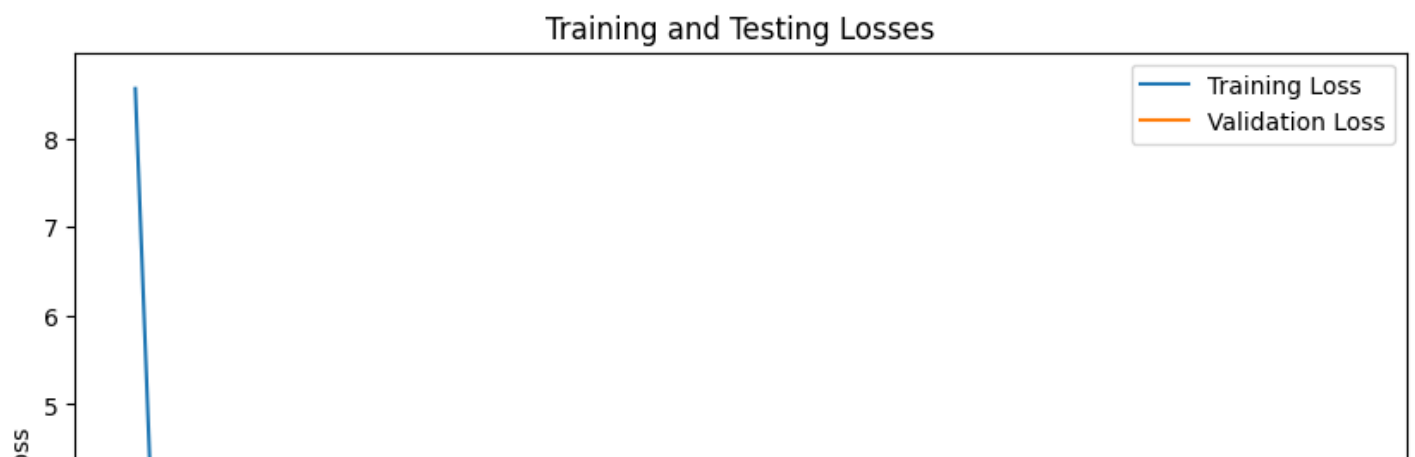
```
# Plot the training and testing losses
plt.figure(figsize=(10, 6))
plt.plot(train_losses, label='Training Loss')
plt.plot(test_losses, label='Validation Loss')
plt.xlabel('Epoch')
plt.ylabel('Loss')
plt.title('Training and Testing Losses')
plt.legend()
plt.show()
```

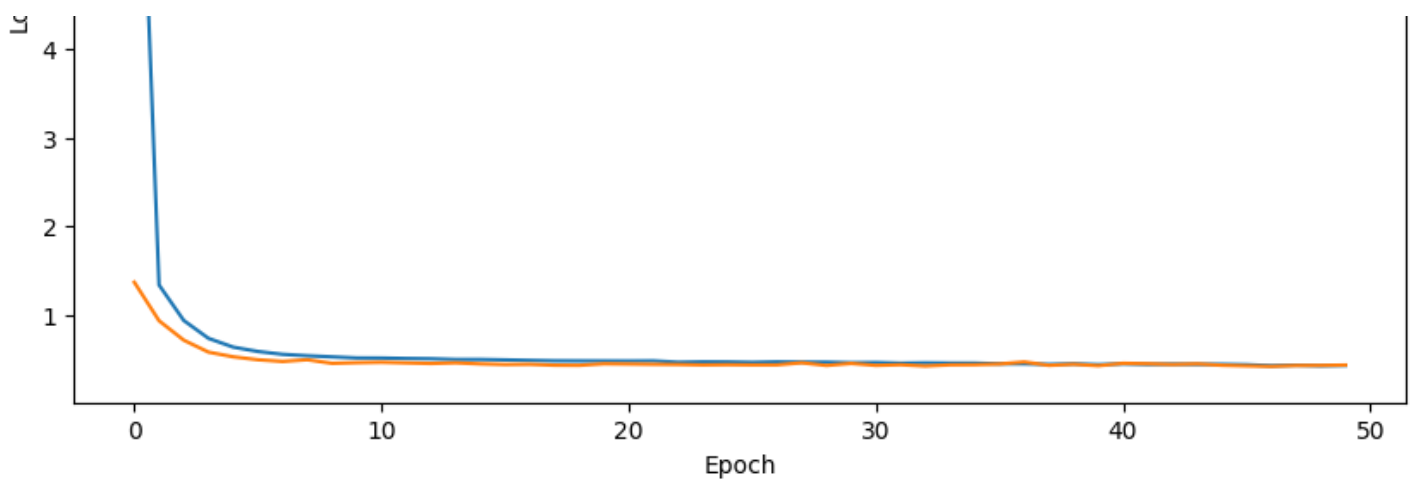


Widzimy że model bardzo szybko się uczy i przy 1000 epokach ma on overfitting. Wyświetlmy więc wykres dla mniejszej ilości epok.

In [93]:

```
# Plot the training and testing losses
plt.figure(figsize=(10, 6))
plt.plot(train_losses[:50], label='Training Loss')
plt.plot(test_losses[:50], label='Validation Loss')
plt.xlabel('Epoch')
plt.ylabel('Loss')
plt.title('Training and Testing Losses')
plt.legend()
plt.show()
```





Jak widzimy model ten bardzo szybko nauczył się rozpoznawania jakości win.

3. Porównanie modeli

By porównać modele wyświetlimy ich dokładność na wykresie.

In [96]:

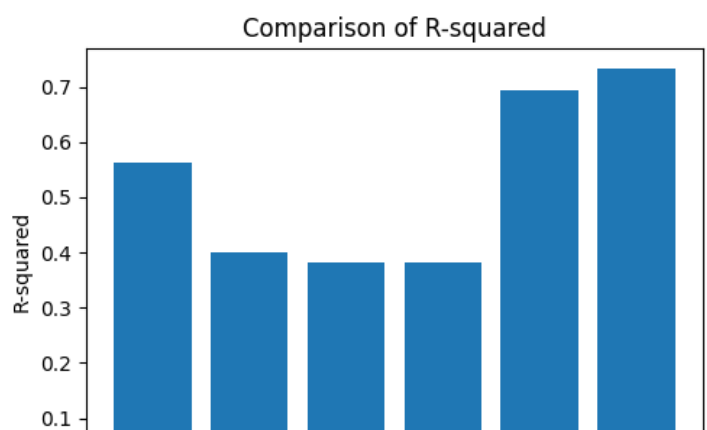
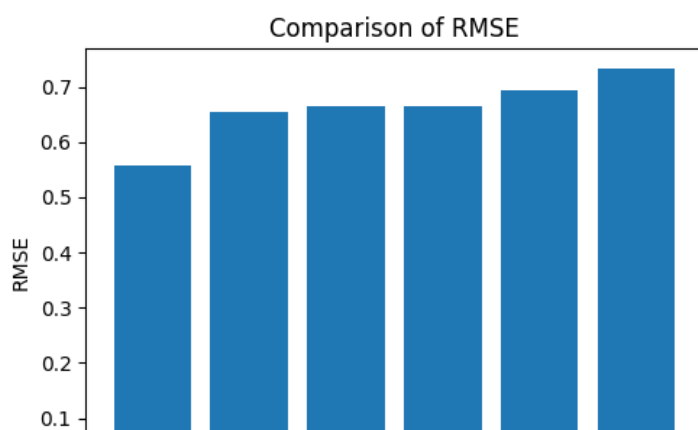
```
# Create lists of RMSE and R-squared values
rmse_values = [random_forest_rmse, nn_rmse[30], nn_rmse[50], nn_rmse[90], nn_rmse[500], nn_rmse[900]]
r2_values = [random_forest_r2, nn_r2[30], nn_r2[50], nn_r2[90], nn_rmse[500], nn_rmse[900]]

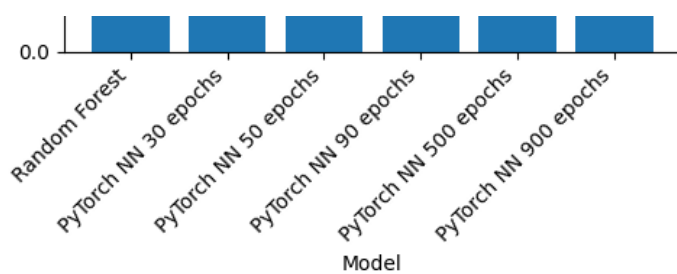
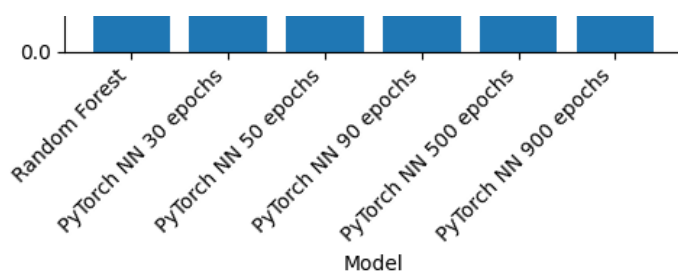
# Define the models' names for plotting
model_names = ['Random Forest', 'PyTorch NN 30 epochs', 'PyTorch NN 50 epochs', 'PyTorch NN 90 epochs', 'PyTorch NN 500 epochs', 'PyTorch NN 900 epochs']

# Plotting RMSE values
plt.figure(figsize=(10, 5))
plt.subplot(1, 2, 1)
plt.bar(model_names, rmse_values)
plt.xlabel('Model')
plt.ylabel('RMSE')
plt.title('Comparison of RMSE')
plt.xticks(rotation=45, ha='right') # Rotate x-axis labels by 45 degrees

# Plotting R-squared values
plt.subplot(1, 2, 2)
plt.bar(model_names, r2_values)
plt.xlabel('Model')
plt.ylabel('R-squared')
plt.title('Comparison of R-squared')
plt.xticks(rotation=45, ha='right') # Rotate x-axis labels by 45 degrees

# Adjust the layout and display the plot
plt.tight_layout()
plt.show()
```





Jak widzimy model napisany w PyTorch jest lepszy od 'Random Forest'. Warto zauważyć, że po jakimś czasie uczenia model robi się coraz gorszy i występuje przetrenowanie.