```
import numpy as np
import pandas as pd
from sklearn.preprocessing import MinMaxScaler
from keras.models import Sequential
from keras.layers import Dense, LSTM
from sklearn.metrics import mean_squared_error, mean_absolute_error, r2_score
from math import sqrt
import matplotlib.pyplot as plt
import warnings
warnings.filterwarnings("ignore")
# Step 1: Data Preprocessing
btc_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_Bitcoin.csv")
eth_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_Ethereum.csv")
xrp_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_XRP.csv")
ltc_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_Litecoin.csv")
usdc_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_USDCoin.csv")

df = pd.concat([btc_df, eth_df, xrp_df, ltc_df, usdc_df])
df.to_csv("cryptocurrency.csv", index=False)

df['Date'] = pd.to_datetime(df['Date'])
df.set_index('Date', inplace=True)
df.sort_index(inplace=True)

# create a list of unique tokens offered on the exchange
tokens = df['Symbol'].unique()

# create a dictionary to store the models and their performance metrics
models = {}

# create a 2x3 grid of subplots
fig, axs = plt.subplots(2, 3, figsize=(15, 10))

# loop through each token and plot its actual vs predicted values on a subplot
for i, token in enumerate(tokens):
    # select the data for the current token
    data = df[df['Symbol'] == token]['Close'].values.reshape(-1, 1)

    # preprocess data
    scaler = MinMaxScaler(feature_range=(0, 1))
    scaled_data = scaler.fit_transform(data)

    # split data into training and testing sets
    train_size = int(len(scaled_data) * 0.7)
    train_data = scaled_data[:train_size, :]
    test_data = scaled_data[train_size:, :]

    # function to create LSTM dataset
    def create_dataset(dataset, look_back=1):
        X, y = [], []
        for i in range(len(dataset)-look_back-1):
            a = dataset[i:(i+look_back), 0]
            X.append(a)
            y.append(dataset[i + look_back, 0])
        return np.array(X), np.array(y)

    # create training and testing data for LSTM model
    look_back = 3
    X_train, y_train = create_dataset(train_data, look_back)
    X_test, y_test = create_dataset(test_data, look_back)

    # reshape input to be [samples, time steps, features]
    X_train = np.reshape(X_train, (X_train.shape[0], X_train.shape[1], 1))
    X_test = np.reshape(X_test, (X_test.shape[0], X_test.shape[1], 1))

    # create and train LSTM model
    model = Sequential()
    model.add(LSTM(50, input_shape=(look_back, 1)))
    model.add(Dense(1))
    model.compile(loss='mean_squared_error', optimizer='adam')
    model.fit(X_train, y_train, epochs=100, batch_size=1, verbose=2)

    # make predictions on test data
    y_pred = model.predict(X_test)

    # inverse transform the scaled data
```

```
    y_test = scaler.inverse_transform(y_test.reshape(-1, 1))
    y_pred = scaler.inverse_transform(y_pred)

    # evaluate model using various performance metrics
    mse = mean_squared_error(y_test, y_pred)
    rmse = sqrt(mse)
    mae = mean_absolute_error(y_test, y_pred)
    mape = np.mean(np.abs((y_test - y_pred) / y_test)) * 100
    corr = np.corrcoef(y_pred.T, y_test.T)[0, 1]
    r2 = r2_score(y_test, y_pred)
     # add the model and its performance metrics to
    models[token] = {'model': model, 'mse': mse, 'rmse': rmse, 'mae': mae, 'mape': mape, 'corr': corr, 'r2': r2}

    # plot actual vs predicted values on a subplot
    row = i // 3
    col = i % 3
    axs[row, col].plot(y_test, label='Actual')
    axs[row, col].plot(y_pred, label='Predicted')
    axs[row, col].set_title('{} Actual vs Predicted Values'.format(token))
    axs[row, col].set_xlabel('Time')
    axs[row, col].set_ylabel('Price')
    axs[row, col].legend()

        # create a table to display evaluation metrics for all models
    results = pd.DataFrame(columns=['Symbol', 'MSE', 'RMSE', 'MAE', 'MAPE', 'Corr', 'R2'])
    for token, metrics in models.items():
        results = results.append({'Symbol': token,
                              'MSE': metrics['mse'],
                              'RMSE': metrics['rmse'],
                              'MAE': metrics['mae'],
                              'MAPE': metrics['mape'],
                              'Corr': metrics['corr'],
                              'R2': metrics['r2']}, ignore_index=True)

    # display results table
    print('\n\nEvaluation Metrics for All Tokens:')
    print(results)

# adjust subplot layout
plt.tight_layout()

# show plot
plt.show()
```

```
Epoch 1/100
2089/2089 - 7s - loss: 1.1287e-04 - 7s/epoch - 3ms/step
Epoch 2/100
2089/2089 - 5s - loss: 4.5560e-05 - 5s/epoch - 2ms/step
Epoch 3/100
2089/2089 - 4s - loss: 3.9334e-05 - 4s/epoch - 2ms/step
Epoch 4/100
2089/2089 - 5s - loss: 3.6777e-05 - 5s/epoch - 3ms/step
Epoch 5/100
2089/2089 - 4s - loss: 3.7634e-05 - 4s/epoch - 2ms/step
Epoch 6/100
2089/2089 - 4s - loss: 2.9677e-05 - 4s/epoch - 2ms/step
Epoch 7/100
2089/2089 - 5s - loss: 2.8427e-05 - 5s/epoch - 3ms/step
Epoch 8/100
2089/2089 - 4s - loss: 3.0985e-05 - 4s/epoch - 2ms/step
Epoch 9/100
2089/2089 - 5s - loss: 2.6137e-05 - 5s/epoch - 2ms/step
Epoch 10/100
2089/2089 - 5s - loss: 2.5466e-05 - 5s/epoch - 2ms/step
Epoch 11/100
2089/2089 - 4s - loss: 2.4578e-05 - 4s/epoch - 2ms/step
Epoch 12/100
2089/2089 - 5s - loss: 2.5724e-05 - 5s/epoch - 3ms/step
Epoch 13/100
2089/2089 - 5s - loss: 2.3969e-05 - 5s/epoch - 2ms/step
Epoch 14/100
2089/2089 - 4s - loss: 2.3802e-05 - 4s/epoch - 2ms/step
Epoch 15/100
2089/2089 - 5s - loss: 2.2870e-05 - 5s/epoch - 3ms/step
Epoch 16/100
2089/2089 - 4s - loss: 2.2586e-05 - 4s/epoch - 2ms/step
Epoch 17/100
2089/2089 - 5s - loss: 2.2747e-05 - 5s/epoch - 2ms/step
Epoch 18/100
2089/2089 - 5s - loss: 2.3131e-05 - 5s/epoch - 3ms/step
Epoch 19/100
2089/2089 - 5s - loss: 2.0254e-05 - 5s/epoch - 2ms/step
Epoch 20/100
2089/2089 - 6s - loss: 2.1920e-05 - 6s/epoch - 3ms/step
Epoch 21/100
2089/2089 - 5s - loss: 2.1066e-05 - 5s/epoch - 2ms/step
Epoch 22/100
2089/2089 - 5s - loss: 2.1087e-05 - 5s/epoch - 2ms/step
Epoch 23/100
2089/2089 - 5s - loss: 2.1346e-05 - 5s/epoch - 2ms/step
Epoch 24/100
2089/2089 - 4s - loss: 2.2392e-05 - 4s/epoch - 2ms/step
Epoch 25/100
2089/2089 - 5s - loss: 2.1491e-05 - 5s/epoch - 3ms/step
Epoch 26/100
2089/2089 - 5s - loss: 2.1330e-05 - 5s/epoch - 2ms/step
Epoch 27/100
2089/2089 - 5s - loss: 2.2304e-05 - 5s/epoch - 3ms/step
Epoch 28/100
2089/2089 - 5s - loss: 2.1162e-05 - 5s/epoch - 2ms/step
Epoch 29/100
2089/2089 - 5s - loss: 1.9877e-05 - 5s/epoch - 3ms/step
Epoch 30/100
2089/2089 - 5s - loss: 2.0345e-05 - 5s/epoch - 2ms/step
Epoch 31/100
2089/2089 - 5s - loss: 2.1260e-05 - 5s/epoch - 2ms/step
Epoch 32/100
2089/2089 - 5s - loss: 2.1475e-05 - 5s/epoch - 2ms/step
Epoch 33/100
2089/2089 - 5s - loss: 2.0063e-05 - 5s/epoch - 2ms/step
Epoch 34/100
2089/2089 - 4s - loss: 1.9812e-05 - 4s/epoch - 2ms/step
Epoch 35/100
2089/2089 - 5s - loss: 2.1461e-05 - 5s/epoch - 2ms/step
Epoch 36/100
2089/2089 - 5s - loss: 1.9759e-05 - 5s/epoch - 2ms/step
Epoch 37/100
2089/2089 - 4s - loss: 2.0253e-05 - 4s/epoch - 2ms/step
Epoch 38/100
2089/2089 - 5s - loss: 1.9710e-05 - 5s/epoch - 2ms/step
Epoch 39/100
2089/2089 - 4s - loss: 1.9461e-05 - 4s/epoch - 2ms/step
Epoch 40/100
2089/2089 - 4s - loss: 2.0184e-05 - 4s/epoch - 2ms/step
Epoch 41/100
2089/2089 - 5s - loss: 2.0131e-05 - 5s/epoch - 2ms/step
Epoch 42/100
2089/2089 - 4s - loss: 1.9449e-05 - 4s/epoch - 2ms/step
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Epoch 43/100
2089/2089 - 5s - loss: 1.8591e-05 - 5s/epoch - 2ms/step
Epoch 44/100
2089/2089 - 5s - loss: 1.9639e-05 - 5s/epoch - 2ms/step
Epoch 45/100
2089/2089 - 4s - loss: 1.9720e-05 - 4s/epoch - 2ms/step
Epoch 46/100
2089/2089 - 5s - loss: 1.9642e-05 - 5s/epoch - 3ms/step
Epoch 47/100
2089/2089 - 4s - loss: 1.9681e-05 - 4s/epoch - 2ms/step
Epoch 48/100
2089/2089 - 4s - loss: 2.0345e-05 - 4s/epoch - 2ms/step
Epoch 49/100
2089/2089 - 5s - loss: 2.0743e-05 - 5s/epoch - 2ms/step
Epoch 50/100
2089/2089 - 4s - loss: 2.0450e-05 - 4s/epoch - 2ms/step
Epoch 51/100
2089/2089 - 5s - loss: 1.8504e-05 - 5s/epoch - 2ms/step
Epoch 52/100
2089/2089 - 5s - loss: 2.0575e-05 - 5s/epoch - 2ms/step
Epoch 53/100
2089/2089 - 4s - loss: 1.7363e-05 - 4s/epoch - 2ms/step
Epoch 54/100
2089/2089 - 5s - loss: 2.0624e-05 - 5s/epoch - 3ms/step
Epoch 55/100
2089/2089 - 4s - loss: 1.9016e-05 - 4s/epoch - 2ms/step
Epoch 56/100
2089/2089 - 4s - loss: 1.8943e-05 - 4s/epoch - 2ms/step
Epoch 57/100
2089/2089 - 5s - loss: 2.0089e-05 - 5s/epoch - 3ms/step
Epoch 58/100
2089/2089 - 4s - loss: 1.8582e-05 - 4s/epoch - 2ms/step
Epoch 59/100
2089/2089 - 4s - loss: 1.8180e-05 - 4s/epoch - 2ms/step
Epoch 60/100
2089/2089 - 5s - loss: 1.8641e-05 - 5s/epoch - 2ms/step
Epoch 61/100
2089/2089 - 4s - loss: 1.9429e-05 - 4s/epoch - 2ms/step
Epoch 62/100
2089/2089 - 5s - loss: 1.8615e-05 - 5s/epoch - 2ms/step
Epoch 63/100
2089/2089 - 5s - loss: 1.8794e-05 - 5s/epoch - 2ms/step
Epoch 64/100
2089/2089 - 4s - loss: 1.8426e-05 - 4s/epoch - 2ms/step
Epoch 65/100
2089/2089 - 5s - loss: 1.9492e-05 - 5s/epoch - 2ms/step
Epoch 66/100
2089/2089 - 4s - loss: 1.7834e-05 - 4s/epoch - 2ms/step
Epoch 67/100
2089/2089 - 4s - loss: 2.0378e-05 - 4s/epoch - 2ms/step
Epoch 68/100
2089/2089 - 5s - loss: 1.9208e-05 - 5s/epoch - 2ms/step
Epoch 69/100
2089/2089 - 4s - loss: 1.8997e-05 - 4s/epoch - 2ms/step
Epoch 70/100
2089/2089 - 5s - loss: 1.9016e-05 - 5s/epoch - 2ms/step
Epoch 71/100
2089/2089 - 5s - loss: 1.9583e-05 - 5s/epoch - 2ms/step
Epoch 72/100
2089/2089 - 4s - loss: 1.8178e-05 - 4s/epoch - 2ms/step
Epoch 73/100
2089/2089 - 5s - loss: 1.7607e-05 - 5s/epoch - 3ms/step
Epoch 74/100
2089/2089 - 4s - loss: 1.9836e-05 - 4s/epoch - 2ms/step
Epoch 75/100
2089/2089 - 4s - loss: 1.8561e-05 - 4s/epoch - 2ms/step
Epoch 76/100
2089/2089 - 5s - loss: 1.8400e-05 - 5s/epoch - 3ms/step
Epoch 77/100
2089/2089 - 4s - loss: 1.8487e-05 - 4s/epoch - 2ms/step
Epoch 78/100
2089/2089 - 5s - loss: 1.8513e-05 - 5s/epoch - 2ms/step
Epoch 79/100
2089/2089 - 5s - loss: 1.8407e-05 - 5s/epoch - 2ms/step
Epoch 80/100
2089/2089 - 4s - loss: 1.9332e-05 - 4s/epoch - 2ms/step
Epoch 81/100
2089/2089 - 5s - loss: 1.9694e-05 - 5s/epoch - 3ms/step
Epoch 82/100
2089/2089 - 4s - loss: 1.8438e-05 - 4s/epoch - 2ms/step
Epoch 83/100
2089/2089 - 4s - loss: 1.7935e-05 - 4s/epoch - 2ms/step
Epoch 84/100
2089/2089 - 5s - loss: 1.8485e-05 - 5s/epoch - 3ms/step
Epoch 85/100
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2089/2089 - 4s - loss: 1.7241e-05 - 4s/epoch - 2ms/step
Epoch 86/100
2089/2089 - 4s - loss: 1.9409e-05 - 4s/epoch - 2ms/step
Epoch 87/100
2089/2089 - 5s - loss: 1.8008e-05 - 5s/epoch - 2ms/step
Epoch 88/100
2089/2089 - 4s - loss: 1.7919e-05 - 4s/epoch - 2ms/step
Epoch 89/100
2089/2089 - 5s - loss: 1.7472e-05 - 5s/epoch - 2ms/step
Epoch 90/100
2089/2089 - 4s - loss: 1.8088e-05 - 4s/epoch - 2ms/step
Epoch 91/100
2089/2089 - 4s - loss: 1.7781e-05 - 4s/epoch - 2ms/step
Epoch 92/100
2089/2089 - 5s - loss: 1.7338e-05 - 5s/epoch - 2ms/step
Epoch 93/100
2089/2089 - 5s - loss: 1.8227e-05 - 5s/epoch - 2ms/step
Epoch 94/100
2089/2089 - 4s - loss: 1.8167e-05 - 4s/epoch - 2ms/step
Epoch 95/100
2089/2089 - 5s - loss: 1.7516e-05 - 5s/epoch - 3ms/step
Epoch 96/100
2089/2089 - 4s - loss: 1.8257e-05 - 4s/epoch - 2ms/step
Epoch 97/100
2089/2089 - 5s - loss: 1.7281e-05 - 5s/epoch - 2ms/step
Epoch 98/100
2089/2089 - 5s - loss: 1.7903e-05 - 5s/epoch - 2ms/step
Epoch 99/100
2089/2089 - 4s - loss: 1.8124e-05 - 4s/epoch - 2ms/step
Epoch 100/100
2089/2089 - 5s - loss: 1.8337e-05 - 5s/epoch - 3ms/step
28/28 [==============================] - 1s 2ms/step


Evaluation Metrics for All Tokens:
  Symbol           MSE         RMSE          MAE      MAPE      Corr        R2
0    BTC  7.754190e+06  2784.634652  1422.443064  5.649198  0.997327  0.968837
Epoch 1/100
2089/2089 - 6s - loss: 0.0016 - 6s/epoch - 3ms/step
Epoch 2/100
2089/2089 - 5s - loss: 4.5702e-04 - 5s/epoch - 3ms/step
Epoch 3/100
2089/2089 - 4s - loss: 4.1922e-04 - 4s/epoch - 2ms/step
Epoch 4/100
2089/2089 - 5s - loss: 4.0663e-04 - 5s/epoch - 2ms/step
Epoch 5/100
2089/2089 - 5s - loss: 3.8288e-04 - 5s/epoch - 3ms/step
Epoch 6/100
2089/2089 - 4s - loss: 3.4617e-04 - 4s/epoch - 2ms/step
Epoch 7/100
2089/2089 - 5s - loss: 3.3957e-04 - 5s/epoch - 3ms/step
Epoch 8/100
2089/2089 - 4s - loss: 2.8946e-04 - 4s/epoch - 2ms/step
Epoch 9/100
2089/2089 - 4s - loss: 2.9559e-04 - 4s/epoch - 2ms/step
Epoch 10/100
2089/2089 - 5s - loss: 2.7039e-04 - 5s/epoch - 3ms/step
Epoch 11/100
2089/2089 - 5s - loss: 2.4447e-04 - 5s/epoch - 2ms/step
Epoch 12/100
2089/2089 - 5s - loss: 2.5829e-04 - 5s/epoch - 3ms/step
Epoch 13/100
2089/2089 - 5s - loss: 2.2564e-04 - 5s/epoch - 2ms/step
Epoch 14/100
2089/2089 - 4s - loss: 2.5194e-04 - 4s/epoch - 2ms/step
Epoch 15/100
2089/2089 - 5s - loss: 2.4432e-04 - 5s/epoch - 3ms/step
Epoch 16/100
2089/2089 - 5s - loss: 2.3371e-04 - 5s/epoch - 2ms/step
Epoch 17/100
2089/2089 - 5s - loss: 2.2144e-04 - 5s/epoch - 2ms/step
Epoch 18/100
2089/2089 - 5s - loss: 2.2578e-04 - 5s/epoch - 3ms/step
Epoch 19/100
2089/2089 - 5s - loss: 2.1717e-04 - 5s/epoch - 2ms/step
Epoch 20/100
2089/2089 - 6s - loss: 2.2255e-04 - 6s/epoch - 3ms/step
Epoch 21/100
2089/2089 - 4s - loss: 2.2864e-04 - 4s/epoch - 2ms/step
Epoch 22/100
2089/2089 - 5s - loss: 2.3155e-04 - 5s/epoch - 2ms/step
Epoch 23/100
2089/2089 - 5s - loss: 2.2245e-04 - 5s/epoch - 3ms/step
Epoch 24/100
2089/2089 - 5s - loss: 2.3550e-04 - 5s/epoch - 2ms/step
```

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Epoch 25/100
2089/2089 - 5s - loss: 2.4388e-04 - 5s/epoch - 3ms/step
Epoch 26/100
2089/2089 - 4s - loss: 2.0288e-04 - 4s/epoch - 2ms/step
Epoch 27/100
2089/2089 - 5s - loss: 2.2007e-04 - 5s/epoch - 2ms/step
Epoch 28/100
2089/2089 - 5s - loss: 2.1707e-04 - 5s/epoch - 3ms/step
Epoch 29/100
2089/2089 - 5s - loss: 2.1135e-04 - 5s/epoch - 2ms/step
Epoch 30/100
2089/2089 - 5s - loss: 2.1923e-04 - 5s/epoch - 2ms/step
Epoch 31/100
2089/2089 - 5s - loss: 2.1188e-04 - 5s/epoch - 2ms/step
Epoch 32/100
2089/2089 - 4s - loss: 2.0177e-04 - 4s/epoch - 2ms/step
Epoch 33/100
2089/2089 - 5s - loss: 2.1836e-04 - 5s/epoch - 3ms/step
Epoch 34/100
2089/2089 - 5s - loss: 2.2116e-04 - 5s/epoch - 2ms/step
Epoch 35/100
2089/2089 - 5s - loss: 2.1756e-04 - 5s/epoch - 2ms/step
Epoch 36/100
2089/2089 - 5s - loss: 2.1866e-04 - 5s/epoch - 3ms/step
Epoch 37/100
2089/2089 - 5s - loss: 2.0083e-04 - 5s/epoch - 2ms/step
Epoch 38/100
2089/2089 - 6s - loss: 2.1489e-04 - 6s/epoch - 3ms/step
Epoch 39/100
2089/2089 - 5s - loss: 2.1156e-04 - 5s/epoch - 2ms/step
Epoch 40/100
2089/2089 - 6s - loss: 2.1247e-04 - 6s/epoch - 3ms/step
Epoch 41/100
2089/2089 - 5s - loss: 2.0942e-04 - 5s/epoch - 2ms/step
Epoch 42/100
2089/2089 - 5s - loss: 1.9566e-04 - 5s/epoch - 2ms/step
Epoch 43/100
2089/2089 - 6s - loss: 1.9568e-04 - 6s/epoch - 3ms/step
Epoch 44/100
2089/2089 - 5s - loss: 2.0813e-04 - 5s/epoch - 2ms/step
Epoch 45/100
2089/2089 - 5s - loss: 2.0757e-04 - 5s/epoch - 2ms/step
Epoch 46/100
2089/2089 - 5s - loss: 2.0170e-04 - 5s/epoch - 2ms/step
Epoch 47/100
2089/2089 - 5s - loss: 2.0057e-04 - 5s/epoch - 2ms/step
Epoch 48/100
2089/2089 - 6s - loss: 2.0330e-04 - 6s/epoch - 3ms/step
Epoch 49/100
2089/2089 - 5s - loss: 2.0319e-04 - 5s/epoch - 2ms/step
Epoch 50/100
2089/2089 - 5s - loss: 2.1056e-04 - 5s/epoch - 3ms/step
Epoch 51/100
2089/2089 - 5s - loss: 2.0824e-04 - 5s/epoch - 3ms/step
Epoch 52/100
2089/2089 - 5s - loss: 2.0551e-04 - 5s/epoch - 2ms/step
Epoch 53/100
2089/2089 - 6s - loss: 1.9600e-04 - 6s/epoch - 3ms/step
Epoch 54/100
2089/2089 - 5s - loss: 2.0163e-04 - 5s/epoch - 2ms/step
Epoch 55/100
2089/2089 - 6s - loss: 1.8900e-04 - 6s/epoch - 3ms/step
Epoch 56/100
2089/2089 - 4s - loss: 2.0433e-04 - 4s/epoch - 2ms/step
Epoch 57/100
2089/2089 - 5s - loss: 1.9253e-04 - 5s/epoch - 2ms/step
Epoch 58/100
2089/2089 - 5s - loss: 1.9637e-04 - 5s/epoch - 3ms/step
Epoch 59/100
2089/2089 - 5s - loss: 2.0816e-04 - 5s/epoch - 2ms/step
Epoch 60/100
2089/2089 - 6s - loss: 2.0085e-04 - 6s/epoch - 3ms/step
Epoch 61/100
2089/2089 - 5s - loss: 1.9127e-04 - 5s/epoch - 2ms/step
Epoch 62/100
2089/2089 - 5s - loss: 2.0712e-04 - 5s/epoch - 2ms/step
Epoch 63/100
2089/2089 - 5s - loss: 1.8799e-04 - 5s/epoch - 3ms/step
Epoch 64/100
2089/2089 - 4s - loss: 1.9813e-04 - 4s/epoch - 2ms/step
Epoch 65/100
2089/2089 - 5s - loss: 1.9723e-04 - 5s/epoch - 3ms/step
Epoch 66/100
2089/2089 - 4s - loss: 1.9618e-04 - 4s/epoch - 2ms/step
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```
Epoch 67/100
2089/2089 - 4s - loss: 1.9990e-04 - 4s/epoch - 2ms/step
Epoch 68/100
2089/2089 - 5s - loss: 2.0526e-04 - 5s/epoch - 3ms/step
Epoch 69/100
2089/2089 - 4s - loss: 2.0944e-04 - 4s/epoch - 2ms/step
Epoch 70/100
2089/2089 - 5s - loss: 2.0497e-04 - 5s/epoch - 2ms/step
Epoch 71/100
2089/2089 - 5s - loss: 1.9526e-04 - 5s/epoch - 2ms/step
Epoch 72/100
2089/2089 - 4s - loss: 2.0641e-04 - 4s/epoch - 2ms/step
Epoch 73/100
2089/2089 - 5s - loss: 1.8783e-04 - 5s/epoch - 3ms/step
Epoch 74/100
2089/2089 - 4s - loss: 2.0590e-04 - 4s/epoch - 2ms/step
Epoch 75/100
2089/2089 - 5s - loss: 2.0121e-04 - 5s/epoch - 2ms/step
Epoch 76/100
2089/2089 - 5s - loss: 2.0482e-04 - 5s/epoch - 3ms/step
Epoch 77/100
2089/2089 - 5s - loss: 1.8450e-04 - 5s/epoch - 2ms/step
Epoch 78/100
2089/2089 - 6s - loss: 1.9778e-04 - 6s/epoch - 3ms/step
Epoch 79/100
2089/2089 - 5s - loss: 1.9188e-04 - 5s/epoch - 2ms/step
Epoch 80/100
2089/2089 - 5s - loss: 2.0233e-04 - 5s/epoch - 2ms/step
Epoch 81/100
2089/2089 - 6s - loss: 1.9847e-04 - 6s/epoch - 3ms/step
Epoch 82/100
2089/2089 - 5s - loss: 2.0249e-04 - 5s/epoch - 2ms/step
Epoch 83/100
2089/2089 - 6s - loss: 1.9576e-04 - 6s/epoch - 3ms/step
Epoch 84/100
2089/2089 - 5s - loss: 1.8815e-04 - 5s/epoch - 2ms/step
Epoch 85/100
2089/2089 - 5s - loss: 1.9763e-04 - 5s/epoch - 2ms/step
Epoch 86/100
2089/2089 - 5s - loss: 2.0226e-04 - 5s/epoch - 2ms/step
Epoch 87/100
2089/2089 - 5s - loss: 1.9728e-04 - 5s/epoch - 2ms/step
Epoch 88/100
2089/2089 - 6s - loss: 1.9901e-04 - 6s/epoch - 3ms/step
Epoch 89/100
2089/2089 - 5s - loss: 1.9995e-04 - 5s/epoch - 2ms/step
Epoch 90/100
2089/2089 - 5s - loss: 1.9969e-04 - 5s/epoch - 2ms/step
Epoch 91/100
2089/2089 - 5s - loss: 1.9707e-04 - 5s/epoch - 3ms/step
Epoch 92/100
2089/2089 - 4s - loss: 1.9745e-04 - 4s/epoch - 2ms/step
Epoch 93/100
2089/2089 - 6s - loss: 2.0144e-04 - 6s/epoch - 3ms/step
Epoch 94/100
2089/2089 - 4s - loss: 1.9591e-04 - 4s/epoch - 2ms/step
Epoch 95/100
2089/2089 - 4s - loss: 2.0247e-04 - 4s/epoch - 2ms/step
Epoch 96/100
2089/2089 - 5s - loss: 1.8982e-04 - 5s/epoch - 3ms/step
Epoch 97/100
2089/2089 - 5s - loss: 1.9749e-04 - 5s/epoch - 2ms/step
Epoch 98/100
2089/2089 - 6s - loss: 1.9380e-04 - 6s/epoch - 3ms/step
Epoch 99/100
2089/2089 - 5s - loss: 1.9658e-04 - 5s/epoch - 2ms/step
Epoch 100/100
2089/2089 - 5s - loss: 1.9648e-04 - 5s/epoch - 3ms/step
28/28 [==============================] - 1s 2ms/step


Evaluation Metrics for All Tokens:
  Symbol           MSE         RMSE          MAE      MAPE      Corr        R2
0    BTC  7.754190e+06  2784.634652  1422.443064  5.649198  0.997327  0.968837
1    LTC  6.538610e+01     8.086167     4.284610  4.272238  0.992228  0.983987
Epoch 1/100
2021/2021 - 7s - loss: 0.0017 - 7s/epoch - 3ms/step
Epoch 2/100
2021/2021 - 5s - loss: 4.5386e-04 - 5s/epoch - 3ms/step
Epoch 3/100
2021/2021 - 5s - loss: 5.2618e-04 - 5s/epoch - 2ms/step
Epoch 4/100
2021/2021 - 5s - loss: 4.2698e-04 - 5s/epoch - 3ms/step
Epoch 5/100
2021/2021 - 5s - loss: 4.7070e-04 - 5s/epoch - 2ms/step
```

```
Epoch 6/100
2021/2021 - 5s - loss: 3.4794e-04 - 5s/epoch - 2ms/step
Epoch 7/100
2021/2021 - 6s - loss: 3.7548e-04 - 6s/epoch - 3ms/step
Epoch 8/100
2021/2021 - 5s - loss: 3.3371e-04 - 5s/epoch - 2ms/step
Epoch 9/100
2021/2021 - 6s - loss: 2.4183e-04 - 6s/epoch - 3ms/step
Epoch 10/100
2021/2021 - 5s - loss: 3.0287e-04 - 5s/epoch - 2ms/step
Epoch 11/100
2021/2021 - 6s - loss: 2.2316e-04 - 6s/epoch - 3ms/step
Epoch 12/100
2021/2021 - 6s - loss: 2.3568e-04 - 6s/epoch - 3ms/step
Epoch 13/100
2021/2021 - 6s - loss: 2.3912e-04 - 6s/epoch - 3ms/step
Epoch 14/100
2021/2021 - 6s - loss: 2.3689e-04 - 6s/epoch - 3ms/step
Epoch 15/100
2021/2021 - 5s - loss: 2.2238e-04 - 5s/epoch - 2ms/step
Epoch 16/100
2021/2021 - 6s - loss: 2.5275e-04 - 6s/epoch - 3ms/step
Epoch 17/100
2021/2021 - 5s - loss: 2.5496e-04 - 5s/epoch - 2ms/step
Epoch 18/100
2021/2021 - 5s - loss: 2.4146e-04 - 5s/epoch - 2ms/step
Epoch 19/100
2021/2021 - 6s - loss: 2.3530e-04 - 6s/epoch - 3ms/step
Epoch 20/100
2021/2021 - 4s - loss: 2.3845e-04 - 4s/epoch - 2ms/step
Epoch 21/100
2021/2021 - 6s - loss: 2.3931e-04 - 6s/epoch - 3ms/step
Epoch 22/100
2021/2021 - 5s - loss: 2.1932e-04 - 5s/epoch - 2ms/step
Epoch 23/100
2021/2021 - 5s - loss: 2.2170e-04 - 5s/epoch - 2ms/step
Epoch 24/100
2021/2021 - 6s - loss: 2.2755e-04 - 6s/epoch - 3ms/step
Epoch 25/100
2021/2021 - 5s - loss: 2.3033e-04 - 5s/epoch - 3ms/step
Epoch 26/100
2021/2021 - 6s - loss: 2.2134e-04 - 6s/epoch - 3ms/step
Epoch 27/100
2021/2021 - 4s - loss: 2.2000e-04 - 4s/epoch - 2ms/step
Epoch 28/100
2021/2021 - 5s - loss: 2.3524e-04 - 5s/epoch - 2ms/step
Epoch 29/100
2021/2021 - 5s - loss: 2.2642e-04 - 5s/epoch - 3ms/step
Epoch 30/100
2021/2021 - 5s - loss: 2.2229e-04 - 5s/epoch - 2ms/step
Epoch 31/100
2021/2021 - 6s - loss: 2.4671e-04 - 6s/epoch - 3ms/step
Epoch 32/100
2021/2021 - 5s - loss: 2.1080e-04 - 5s/epoch - 3ms/step
Epoch 33/100
2021/2021 - 6s - loss: 2.1782e-04 - 6s/epoch - 3ms/step
Epoch 34/100
2021/2021 - 5s - loss: 2.2174e-04 - 5s/epoch - 2ms/step
Epoch 35/100
2021/2021 - 5s - loss: 2.1002e-04 - 5s/epoch - 2ms/step
Epoch 36/100
2021/2021 - 5s - loss: 1.9447e-04 - 5s/epoch - 3ms/step
Epoch 37/100
2021/2021 - 5s - loss: 1.9524e-04 - 5s/epoch - 2ms/step
Epoch 38/100
2021/2021 - 5s - loss: 2.2281e-04 - 5s/epoch - 3ms/step
Epoch 39/100
2021/2021 - 5s - loss: 2.1359e-04 - 5s/epoch - 2ms/step
Epoch 40/100
2021/2021 - 5s - loss: 2.1785e-04 - 5s/epoch - 2ms/step
Epoch 41/100
2021/2021 - 5s - loss: 2.0974e-04 - 5s/epoch - 3ms/step
Epoch 42/100
2021/2021 - 4s - loss: 1.7608e-04 - 4s/epoch - 2ms/step
Epoch 43/100
2021/2021 - 5s - loss: 2.1923e-04 - 5s/epoch - 2ms/step
Epoch 44/100
2021/2021 - 5s - loss: 2.1422e-04 - 5s/epoch - 3ms/step
Epoch 45/100
2021/2021 - 4s - loss: 2.1845e-04 - 4s/epoch - 2ms/step
Epoch 46/100
2021/2021 - 5s - loss: 2.1686e-04 - 5s/epoch - 3ms/step
Epoch 47/100
2021/2021 - 4s - loss: 1.9201e-04 - 4s/epoch - 2ms/step
Epoch 48/100
```

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2021/2021 - 4s - loss: 2.0611e-04 - 4s/epoch - 2ms/step
Epoch 49/100
2021/2021 - 5s - loss: 2.0767e-04 - 5s/epoch - 3ms/step
Epoch 50/100
2021/2021 - 5s - loss: 2.1042e-04 - 5s/epoch - 2ms/step
Epoch 51/100
2021/2021 - 5s - loss: 2.0170e-04 - 5s/epoch - 3ms/step
Epoch 52/100
2021/2021 - 5s - loss: 2.0788e-04 - 5s/epoch - 2ms/step
Epoch 53/100
2021/2021 - 4s - loss: 2.0860e-04 - 4s/epoch - 2ms/step
Epoch 54/100
2021/2021 - 5s - loss: 1.8518e-04 - 5s/epoch - 3ms/step
Epoch 55/100
2021/2021 - 4s - loss: 1.9792e-04 - 4s/epoch - 2ms/step
Epoch 56/100
2021/2021 - 4s - loss: 2.0504e-04 - 4s/epoch - 2ms/step
Epoch 57/100
2021/2021 - 5s - loss: 2.0461e-04 - 5s/epoch - 3ms/step
Epoch 58/100
2021/2021 - 4s - loss: 1.9676e-04 - 4s/epoch - 2ms/step
Epoch 59/100
2021/2021 - 5s - loss: 2.0072e-04 - 5s/epoch - 2ms/step
Epoch 60/100
2021/2021 - 5s - loss: 2.0322e-04 - 5s/epoch - 2ms/step
Epoch 61/100
2021/2021 - 4s - loss: 2.0815e-04 - 4s/epoch - 2ms/step
Epoch 62/100
2021/2021 - 6s - loss: 2.0378e-04 - 6s/epoch - 3ms/step
Epoch 63/100
2021/2021 - 4s - loss: 2.0230e-04 - 4s/epoch - 2ms/step
Epoch 64/100
2021/2021 - 4s - loss: 2.0272e-04 - 4s/epoch - 2ms/step
Epoch 65/100
2021/2021 - 5s - loss: 1.9635e-04 - 5s/epoch - 3ms/step
Epoch 66/100
2021/2021 - 4s - loss: 2.1144e-04 - 4s/epoch - 2ms/step
Epoch 67/100
2021/2021 - 6s - loss: 1.9517e-04 - 6s/epoch - 3ms/step
Epoch 68/100
2021/2021 - 5s - loss: 1.8889e-04 - 5s/epoch - 2ms/step
Epoch 69/100
2021/2021 - 4s - loss: 1.9561e-04 - 4s/epoch - 2ms/step
Epoch 70/100
2021/2021 - 5s - loss: 2.0291e-04 - 5s/epoch - 3ms/step
Epoch 71/100
2021/2021 - 5s - loss: 1.9160e-04 - 5s/epoch - 2ms/step
Epoch 72/100
2021/2021 - 4s - loss: 1.8282e-04 - 4s/epoch - 2ms/step
Epoch 73/100
2021/2021 - 5s - loss: 1.9007e-04 - 5s/epoch - 3ms/step
Epoch 74/100
2021/2021 - 5s - loss: 1.8865e-04 - 5s/epoch - 2ms/step
Epoch 75/100
2021/2021 - 5s - loss: 1.8762e-04 - 5s/epoch - 3ms/step
Epoch 76/100
2021/2021 - 5s - loss: 2.0703e-04 - 5s/epoch - 2ms/step
Epoch 77/100
2021/2021 - 4s - loss: 1.8572e-04 - 4s/epoch - 2ms/step
Epoch 78/100
2021/2021 - 5s - loss: 2.0154e-04 - 5s/epoch - 3ms/step
Epoch 79/100
2021/2021 - 5s - loss: 2.0133e-04 - 5s/epoch - 2ms/step
Epoch 80/100
2021/2021 - 5s - loss: 1.9762e-04 - 5s/epoch - 2ms/step
Epoch 81/100
2021/2021 - 5s - loss: 1.7256e-04 - 5s/epoch - 2ms/step
Epoch 82/100
2021/2021 - 4s - loss: 2.0588e-04 - 4s/epoch - 2ms/step
Epoch 83/100
2021/2021 - 5s - loss: 1.8540e-04 - 5s/epoch - 3ms/step
Epoch 84/100
2021/2021 - 4s - loss: 2.1018e-04 - 4s/epoch - 2ms/step
Epoch 85/100
2021/2021 - 4s - loss: 1.8425e-04 - 4s/epoch - 2ms/step
Epoch 86/100
2021/2021 - 5s - loss: 1.8859e-04 - 5s/epoch - 3ms/step
Epoch 87/100
2021/2021 - 4s - loss: 1.8386e-04 - 4s/epoch - 2ms/step
Epoch 88/100
2021/2021 - 5s - loss: 1.9855e-04 - 5s/epoch - 2ms/step
Epoch 89/100
2021/2021 - 5s - loss: 1.8349e-04 - 5s/epoch - 3ms/step
Epoch 90/100
```

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2021/2021 - 5s - loss: 2.2109e-04 - 5s/epoch - 2ms/step
Epoch 91/100
2021/2021 - 5s - loss: 1.8960e-04 - 5s/epoch - 3ms/step
Epoch 92/100
2021/2021 - 4s - loss: 1.8370e-04 - 4s/epoch - 2ms/step
Epoch 93/100
2021/2021 - 4s - loss: 1.9356e-04 - 4s/epoch - 2ms/step
Epoch 94/100
2021/2021 - 5s - loss: 1.7799e-04 - 5s/epoch - 3ms/step
Epoch 95/100
2021/2021 - 4s - loss: 1.9634e-04 - 4s/epoch - 2ms/step
Epoch 96/100
2021/2021 - 5s - loss: 1.9587e-04 - 5s/epoch - 2ms/step
Epoch 97/100
2021/2021 - 5s - loss: 1.9350e-04 - 5s/epoch - 2ms/step
Epoch 98/100
2021/2021 - 4s - loss: 1.9532e-04 - 4s/epoch - 2ms/step
Epoch 99/100
2021/2021 - 5s - loss: 1.9858e-04 - 5s/epoch - 3ms/step
Epoch 100/100
2021/2021 - 5s - loss: 1.7588e-04 - 5s/epoch - 2ms/step
27/27 [==============================] - 0s 2ms/step


Evaluation Metrics for All Tokens:
  Symbol           MSE         RMSE          MAE      MAPE      Corr        R2
0    BTC  7.754190e+06  2784.634652  1422.443064  5.649198  0.997327  0.968837
1    LTC  6.538610e+01     8.086167     4.284610  4.272238  0.992228  0.983987
2    XRP  2.104959e-03     0.045880     0.019802  4.117366  0.987843  0.975044
Epoch 1/100
1508/1508 - 6s - loss: 1.7170e-04 - 6s/epoch - 4ms/step
Epoch 2/100
1508/1508 - 3s - loss: 8.7270e-05 - 3s/epoch - 2ms/step
Epoch 3/100
1508/1508 - 3s - loss: 7.0452e-05 - 3s/epoch - 2ms/step
Epoch 4/100
1508/1508 - 4s - loss: 6.2838e-05 - 4s/epoch - 2ms/step
Epoch 5/100
1508/1508 - 4s - loss: 5.9763e-05 - 4s/epoch - 3ms/step
Epoch 6/100
1508/1508 - 3s - loss: 5.3956e-05 - 3s/epoch - 2ms/step
Epoch 7/100
1508/1508 - 4s - loss: 5.8057e-05 - 4s/epoch - 3ms/step
Epoch 8/100
1508/1508 - 5s - loss: 4.2574e-05 - 5s/epoch - 4ms/step
Epoch 9/100
1508/1508 - 3s - loss: 4.7064e-05 - 3s/epoch - 2ms/step
Epoch 10/100
1508/1508 - 3s - loss: 4.4698e-05 - 3s/epoch - 2ms/step
Epoch 11/100
1508/1508 - 8s - loss: 3.9285e-05 - 8s/epoch - 6ms/step
Epoch 12/100
1508/1508 - 6s - loss: 3.8620e-05 - 6s/epoch - 4ms/step
Epoch 13/100
1508/1508 - 7s - loss: 3.8359e-05 - 7s/epoch - 4ms/step
Epoch 14/100
1508/1508 - 4s - loss: 4.1592e-05 - 4s/epoch - 3ms/step
Epoch 15/100
1508/1508 - 4s - loss: 4.0454e-05 - 4s/epoch - 3ms/step
Epoch 16/100
1508/1508 - 4s - loss: 3.7866e-05 - 4s/epoch - 2ms/step
Epoch 17/100
1508/1508 - 3s - loss: 3.8057e-05 - 3s/epoch - 2ms/step
Epoch 18/100
1508/1508 - 3s - loss: 3.7976e-05 - 3s/epoch - 2ms/step
Epoch 19/100
1508/1508 - 5s - loss: 3.5607e-05 - 5s/epoch - 4ms/step
Epoch 20/100
1508/1508 - 3s - loss: 3.6546e-05 - 3s/epoch - 2ms/step
Epoch 21/100
1508/1508 - 3s - loss: 3.6860e-05 - 3s/epoch - 2ms/step
Epoch 22/100
1508/1508 - 4s - loss: 3.4569e-05 - 4s/epoch - 3ms/step
Epoch 23/100
1508/1508 - 3s - loss: 3.7952e-05 - 3s/epoch - 2ms/step
Epoch 24/100
1508/1508 - 3s - loss: 3.6526e-05 - 3s/epoch - 2ms/step
Epoch 25/100
1508/1508 - 3s - loss: 3.6700e-05 - 3s/epoch - 2ms/step
Epoch 26/100
1508/1508 - 4s - loss: 3.8157e-05 - 4s/epoch - 3ms/step
Epoch 27/100
1508/1508 - 3s - loss: 3.5729e-05 - 3s/epoch - 2ms/step
Epoch 28/100
1508/1508 - 3s - loss: 3.5839e-05 - 3s/epoch - 2ms/step
```

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Epoch 29/100
1508/1508 - 4s - loss: 3.3694e-05 - 4s/epoch - 3ms/step
Epoch 30/100
1508/1508 - 4s - loss: 3.2464e-05 - 4s/epoch - 2ms/step
Epoch 31/100
1508/1508 - 3s - loss: 3.5489e-05 - 3s/epoch - 2ms/step
Epoch 32/100
1508/1508 - 3s - loss: 3.5250e-05 - 3s/epoch - 2ms/step
Epoch 33/100
1508/1508 - 4s - loss: 3.4291e-05 - 4s/epoch - 3ms/step
Epoch 34/100
1508/1508 - 3s - loss: 3.2831e-05 - 3s/epoch - 2ms/step
Epoch 35/100
1508/1508 - 3s - loss: 3.3173e-05 - 3s/epoch - 2ms/step
Epoch 36/100
1508/1508 - 3s - loss: 3.3909e-05 - 3s/epoch - 2ms/step
Epoch 37/100
1508/1508 - 4s - loss: 3.2124e-05 - 4s/epoch - 3ms/step
Epoch 38/100
1508/1508 - 3s - loss: 3.2296e-05 - 3s/epoch - 2ms/step
Epoch 39/100
1508/1508 - 3s - loss: 3.2996e-05 - 3s/epoch - 2ms/step
Epoch 40/100
1508/1508 - 5s - loss: 3.0491e-05 - 5s/epoch - 3ms/step
Epoch 41/100
1508/1508 - 4s - loss: 3.2776e-05 - 4s/epoch - 3ms/step
Epoch 42/100
1508/1508 - 3s - loss: 3.3015e-05 - 3s/epoch - 2ms/step
Epoch 43/100
1508/1508 - 4s - loss: 3.2210e-05 - 4s/epoch - 2ms/step
Epoch 44/100
1508/1508 - 4s - loss: 3.4669e-05 - 4s/epoch - 2ms/step
Epoch 45/100
1508/1508 - 3s - loss: 3.3878e-05 - 3s/epoch - 2ms/step
Epoch 46/100
1508/1508 - 3s - loss: 3.2560e-05 - 3s/epoch - 2ms/step
Epoch 47/100
1508/1508 - 4s - loss: 3.4611e-05 - 4s/epoch - 3ms/step
Epoch 48/100
1508/1508 - 3s - loss: 3.1535e-05 - 3s/epoch - 2ms/step
Epoch 49/100
1508/1508 - 3s - loss: 3.1561e-05 - 3s/epoch - 2ms/step
Epoch 50/100
1508/1508 - 3s - loss: 3.3858e-05 - 3s/epoch - 2ms/step
Epoch 51/100
1508/1508 - 4s - loss: 3.3300e-05 - 4s/epoch - 3ms/step
Epoch 52/100
1508/1508 - 3s - loss: 3.2975e-05 - 3s/epoch - 2ms/step
Epoch 53/100
1508/1508 - 4s - loss: 3.2421e-05 - 4s/epoch - 2ms/step
Epoch 54/100
1508/1508 - 4s - loss: 3.0978e-05 - 4s/epoch - 3ms/step
Epoch 55/100
1508/1508 - 4s - loss: 3.2177e-05 - 4s/epoch - 3ms/step
Epoch 56/100
1508/1508 - 4s - loss: 3.2377e-05 - 4s/epoch - 2ms/step
Epoch 57/100
1508/1508 - 4s - loss: 3.0836e-05 - 4s/epoch - 3ms/step
Epoch 58/100
1508/1508 - 3s - loss: 3.1738e-05 - 3s/epoch - 2ms/step
Epoch 59/100
1508/1508 - 3s - loss: 3.0544e-05 - 3s/epoch - 2ms/step
Epoch 60/100
1508/1508 - 3s - loss: 3.1219e-05 - 3s/epoch - 2ms/step
Epoch 61/100
1508/1508 - 4s - loss: 3.2856e-05 - 4s/epoch - 3ms/step
Epoch 62/100
1508/1508 - 3s - loss: 3.1115e-05 - 3s/epoch - 2ms/step
Epoch 63/100
1508/1508 - 3s - loss: 3.3279e-05 - 3s/epoch - 2ms/step
Epoch 64/100
1508/1508 - 4s - loss: 3.1767e-05 - 4s/epoch - 3ms/step
Epoch 65/100
1508/1508 - 4s - loss: 3.0817e-05 - 4s/epoch - 2ms/step
Epoch 66/100
1508/1508 - 3s - loss: 3.1130e-05 - 3s/epoch - 2ms/step
Epoch 67/100
1508/1508 - 3s - loss: 3.1469e-05 - 3s/epoch - 2ms/step
Epoch 68/100
1508/1508 - 4s - loss: 3.2620e-05 - 4s/epoch - 3ms/step
Epoch 69/100
1508/1508 - 3s - loss: 3.1828e-05 - 3s/epoch - 2ms/step
Epoch 70/100
1508/1508 - 3s - loss: 3.1670e-05 - 3s/epoch - 2ms/step
Epoch 71/100
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1508/1508 - 4s - loss: 3.1653e-05 - 4s/epoch - 2ms/step
Epoch 72/100
1508/1508 - 4s - loss: 3.2527e-05 - 4s/epoch - 3ms/step
Epoch 73/100
1508/1508 - 3s - loss: 3.1550e-05 - 3s/epoch - 2ms/step
Epoch 74/100
1508/1508 - 3s - loss: 3.1839e-05 - 3s/epoch - 2ms/step
Epoch 75/100
1508/1508 - 4s - loss: 3.1269e-05 - 4s/epoch - 3ms/step
Epoch 76/100
1508/1508 - 3s - loss: 3.3752e-05 - 3s/epoch - 2ms/step
Epoch 77/100
1508/1508 - 3s - loss: 3.1363e-05 - 3s/epoch - 2ms/step
Epoch 78/100
1508/1508 - 4s - loss: 3.1028e-05 - 4s/epoch - 2ms/step
Epoch 79/100
1508/1508 - 4s - loss: 3.0068e-05 - 4s/epoch - 3ms/step
Epoch 80/100
1508/1508 - 3s - loss: 3.2071e-05 - 3s/epoch - 2ms/step
Epoch 81/100
1508/1508 - 3s - loss: 3.2630e-05 - 3s/epoch - 2ms/step
Epoch 82/100
1508/1508 - 4s - loss: 3.1480e-05 - 4s/epoch - 3ms/step
Epoch 83/100
1508/1508 - 3s - loss: 3.2113e-05 - 3s/epoch - 2ms/step
Epoch 84/100
1508/1508 - 3s - loss: 3.1994e-05 - 3s/epoch - 2ms/step
Epoch 85/100
1508/1508 - 3s - loss: 3.3042e-05 - 3s/epoch - 2ms/step
Epoch 86/100
1508/1508 - 4s - loss: 3.1000e-05 - 4s/epoch - 3ms/step
Epoch 87/100
1508/1508 - 3s - loss: 2.9236e-05 - 3s/epoch - 2ms/step
Epoch 88/100
1508/1508 - 3s - loss: 3.1628e-05 - 3s/epoch - 2ms/step
Epoch 89/100
1508/1508 - 4s - loss: 3.0059e-05 - 4s/epoch - 2ms/step
Epoch 90/100
1508/1508 - 4s - loss: 3.1142e-05 - 4s/epoch - 2ms/step
Epoch 91/100
1508/1508 - 3s - loss: 3.0867e-05 - 3s/epoch - 2ms/step
Epoch 92/100
1508/1508 - 3s - loss: 3.0833e-05 - 3s/epoch - 2ms/step
Epoch 93/100
1508/1508 - 4s - loss: 3.0984e-05 - 4s/epoch - 3ms/step
Epoch 94/100
1508/1508 - 3s - loss: 3.0874e-05 - 3s/epoch - 2ms/step
Epoch 95/100
1508/1508 - 3s - loss: 3.0154e-05 - 3s/epoch - 2ms/step
Epoch 96/100
1508/1508 - 3s - loss: 3.1639e-05 - 3s/epoch - 2ms/step
Epoch 97/100
1508/1508 - 4s - loss: 3.0814e-05 - 4s/epoch - 3ms/step
Epoch 98/100
1508/1508 - 3s - loss: 3.1173e-05 - 3s/epoch - 2ms/step
Epoch 99/100
1508/1508 - 3s - loss: 3.0599e-05 - 3s/epoch - 2ms/step
Epoch 100/100
1508/1508 - 4s - loss: 3.1046e-05 - 4s/epoch - 2ms/step
21/21 [==============================] - 1s 3ms/step

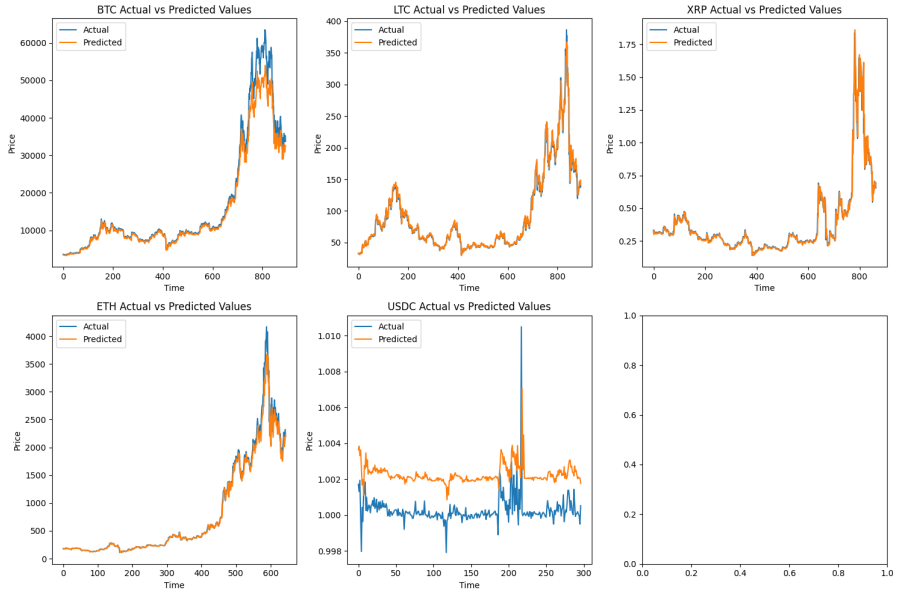

Evaluation Metrics for All Tokens:
  Symbol           MSE         RMSE          MAE      MAPE      Corr        R2
0    BTC  7.754190e+06  2784.634652  1422.443064  5.649198  0.997327  0.968837
1    LTC  6.538610e+01     8.086167     4.284610  4.272238  0.992228  0.983987
2    XRP  2.104959e-03     0.045880     0.019802  4.117366  0.987843  0.975044
3    ETH  1.188662e+04   109.025789    46.034235  4.014037  0.995155  0.985382
Epoch 1/100
697/697 - 4s - loss: 0.0108 - 4s/epoch - 5ms/step
Epoch 2/100
697/697 - 1s - loss: 0.0051 - 1s/epoch - 2ms/step
Epoch 3/100
697/697 - 2s - loss: 0.0050 - 2s/epoch - 2ms/step
Epoch 4/100
697/697 - 1s - loss: 0.0050 - 1s/epoch - 2ms/step
Epoch 5/100
697/697 - 1s - loss: 0.0047 - 1s/epoch - 2ms/step
Epoch 6/100
697/697 - 2s - loss: 0.0047 - 2s/epoch - 2ms/step
Epoch 7/100
697/697 - 2s - loss: 0.0048 - 2s/epoch - 3ms/step
Epoch 8/100
697/697 - 2s - loss: 0.0047 - 2s/epoch - 2ms/step
Epoch 9/100
```

```
Epoch 9/100
697/697 - 2s - loss: 0.0045 - 2s/epoch - 2ms/step
Epoch 10/100
697/697 - 2s - loss: 0.0049 - 2s/epoch - 2ms/step
Epoch 11/100
697/697 - 2s - loss: 0.0046 - 2s/epoch - 2ms/step
Epoch 12/100
697/697 - 2s - loss: 0.0047 - 2s/epoch - 2ms/step
Epoch 13/100
697/697 - 2s - loss: 0.0045 - 2s/epoch - 2ms/step
Epoch 14/100
697/697 - 2s - loss: 0.0046 - 2s/epoch - 3ms/step
Epoch 15/100
697/697 - 2s - loss: 0.0046 - 2s/epoch - 2ms/step
Epoch 16/100
697/697 - 2s - loss: 0.0045 - 2s/epoch - 2ms/step
Epoch 17/100
697/697 - 2s - loss: 0.0045 - 2s/epoch - 2ms/step
Epoch 18/100
697/697 - 2s - loss: 0.0045 - 2s/epoch - 2ms/step
Epoch 19/100
697/697 - 2s - loss: 0.0044 - 2s/epoch - 2ms/step
Epoch 20/100
697/697 - 1s - loss: 0.0046 - 1s/epoch - 2ms/step
Epoch 21/100
697/697 - 2s - loss: 0.0046 - 2s/epoch - 2ms/step
Epoch 22/100
697/697 - 2s - loss: 0.0045 - 2s/epoch - 3ms/step
Epoch 23/100
697/697 - 2s - loss: 0.0045 - 2s/epoch - 2ms/step
Epoch 24/100
697/697 - 2s - loss: 0.0044 - 2s/epoch - 2ms/step
Epoch 25/100
697/697 - 2s - loss: 0.0046 - 2s/epoch - 2ms/step
Epoch 26/100
697/697 - 2s - loss: 0.0045 - 2s/epoch - 2ms/step
Epoch 27/100
697/697 - 2s - loss: 0.0045 - 2s/epoch - 2ms/step
Epoch 28/100
697/697 - 2s - loss: 0.0044 - 2s/epoch - 2ms/step
Epoch 29/100
697/697 - 2s - loss: 0.0044 - 2s/epoch - 3ms/step
Epoch 30/100
697/697 - 2s - loss: 0.0044 - 2s/epoch - 3ms/step
Epoch 31/100
697/697 - 1s - loss: 0.0044 - 1s/epoch - 2ms/step
Epoch 32/100
697/697 - 2s - loss: 0.0044 - 2s/epoch - 2ms/step
Epoch 33/100
697/697 - 2s - loss: 0.0044 - 2s/epoch - 2ms/step
Epoch 34/100
697/697 - 2s - loss: 0.0045 - 2s/epoch - 2ms/step
Epoch 35/100
697/697 - 2s - loss: 0.0044 - 2s/epoch - 2ms/step
Epoch 36/100
697/697 - 2s - loss: 0.0043 - 2s/epoch - 2ms/step
Epoch 37/100
697/697 - 2s - loss: 0.0044 - 2s/epoch - 3ms/step
Epoch 38/100
697/697 - 2s - loss: 0.0044 - 2s/epoch - 3ms/step
Epoch 39/100
697/697 - 1s - loss: 0.0044 - 1s/epoch - 2ms/step
Epoch 40/100
697/697 - 2s - loss: 0.0045 - 2s/epoch - 2ms/step
Epoch 41/100
697/697 - 1s - loss: 0.0043 - 1s/epoch - 2ms/step
Epoch 42/100
697/697 - 1s - loss: 0.0043 - 1s/epoch - 2ms/step
Epoch 43/100
697/697 - 2s - loss: 0.0043 - 2s/epoch - 2ms/step
Epoch 44/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 45/100
697/697 - 2s - loss: 0.0043 - 2s/epoch - 3ms/step
Epoch 46/100
697/697 - 2s - loss: 0.0043 - 2s/epoch - 2ms/step
Epoch 47/100
697/697 - 1s - loss: 0.0044 - 1s/epoch - 2ms/step
Epoch 48/100
697/697 - 2s - loss: 0.0043 - 2s/epoch - 2ms/step
Epoch 49/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 50/100
697/697 - 1s - loss: 0.0042 - 1s/epoch - 2ms/step
Epoch 51/100
```

```
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 52/100
697/697 - 2s - loss: 0.0043 - 2s/epoch - 2ms/step
Epoch 53/100
697/697 - 2s - loss: 0.0044 - 2s/epoch - 3ms/step
Epoch 54/100
697/697 - 1s - loss: 0.0042 - 1s/epoch - 2ms/step
Epoch 55/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 56/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 57/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 58/100
697/697 - 2s - loss: 0.0043 - 2s/epoch - 2ms/step
Epoch 59/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 60/100
697/697 - 2s - loss: 0.0043 - 2s/epoch - 3ms/step
Epoch 61/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 3ms/step
Epoch 62/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 63/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 64/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 65/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 66/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 2ms/step
Epoch 67/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 3ms/step
Epoch 68/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 3ms/step
Epoch 69/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 70/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 71/100
697/697 - 1s - loss: 0.0042 - 1s/epoch - 2ms/step
Epoch 72/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 2ms/step
Epoch 73/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 74/100
697/697 - 1s - loss: 0.0041 - 1s/epoch - 2ms/step
Epoch 75/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 3ms/step
Epoch 76/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 3ms/step
Epoch 77/100
697/697 - 1s - loss: 0.0041 - 1s/epoch - 2ms/step
Epoch 78/100
697/697 - 2s - loss: 0.0040 - 2s/epoch - 2ms/step
Epoch 79/100
697/697 - 2s - loss: 0.0040 - 2s/epoch - 2ms/step
Epoch 80/100
697/697 - 2s - loss: 0.0042 - 2s/epoch - 2ms/step
Epoch 81/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 2ms/step
Epoch 82/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 2ms/step
Epoch 83/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 3ms/step
Epoch 84/100
697/697 - 2s - loss: 0.0040 - 2s/epoch - 3ms/step
Epoch 85/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 2ms/step
Epoch 86/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 2ms/step
Epoch 87/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 2ms/step
Epoch 88/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 2ms/step
Epoch 89/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 2ms/step
Epoch 90/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 3ms/step
Epoch 91/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 3ms/step
Epoch 92/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 2ms/step
Epoch 93/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 2ms/step
```

```
Epoch 94/100
697/697 - 2s - loss: 0.0040 - 2s/epoch - 2ms/step
Epoch 95/100
697/697 - 2s - loss: 0.0041 - 2s/epoch - 2ms/step
Epoch 96/100
697/697 - 2s - loss: 0.0040 - 2s/epoch - 2ms/step
Epoch 97/100
697/697 - 1s - loss: 0.0040 - 1s/epoch - 2ms/step
Epoch 98/100
697/697 - 2s - loss: 0.0040 - 2s/epoch - 3ms/step
Epoch 99/100
697/697 - 2s - loss: 0.0040 - 2s/epoch - 3ms/step
Epoch 100/100
697/697 - 2s - loss: 0.0040 - 2s/epoch - 2ms/step
10/10 [==============================] - 0s 3ms/step


Evaluation Metrics for All Tokens:
  Symbol           MSE         RMSE          MAE      MAPE      Corr        R2
0    BTC  7.754190e+06  2784.634652  1422.443064  5.649198  0.997327  0.968837
1    LTC  6.538610e+01     8.086167     4.284610  4.272238  0.992228  0.983987
2    XRP  2.104959e-03     0.045880     0.019802  4.117366  0.987843  0.975044
3    ETH  1.188662e+04   109.025789    46.034235  4.014037  0.995155  0.985382
4   USDC  4.595762e-06     0.002144     0.002036  0.203584  0.302861 -5.801066
```



```
import numpy as np
import pandas as pd
from sklearn.preprocessing import MinMaxScaler
from keras.models import Sequential
from keras.layers import Dense, LSTM, Dropout
from sklearn.metrics import mean_squared_error, mean_absolute_error, r2_score
from math import sqrt
import matplotlib.pyplot as plt
import warnings
warnings.filterwarnings("ignore")

# Step 1: Data Preprocessing
btc_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_Bitcoin.csv")
eth_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_Ethereum.csv")
xrp_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_XRP.csv")
ltc_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_Litecoin.csv")
usdc_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_USDCoin.csv")

df = pd.concat([btc_df, eth_df, xrp_df, ltc_df, usdc_df])
df.to_csv("cryptocurrency.csv", index=False)
df['Date'] = pd.to_datetime(df['Date'])
df.set_index('Date', inplace=True)
df.sort_index(inplace=True)

# create a list of unique tokens offered on the exchange
tokens = df['Symbol'].unique()

# create a dictionary to store the models and their performance metrics
models = {}

# create a 2x3 grid of subplots
fig, axs = plt.subplots(2, 3, figsize=(15, 10))

# loop through each token and plot its actual vs predicted values on a subplot
for i, token in enumerate(tokens):
    # select the data for the current token
    data = df[df['Symbol'] == token]['Close'].values.reshape(-1, 1)

    # preprocess data
    scaler = MinMaxScaler(feature_range=(0, 1))
    scaled_data = scaler.fit_transform(data)

    # split data into training and testing sets
    train_size = int(len(scaled_data) * 0.7)
    train_data = scaled_data[:train_size, :]
    test_data = scaled_data[train_size:, :]

    # function to create LSTM dataset
    def create_dataset(dataset, look_back=1):
        X, y = [], []
        for i in range(len(dataset)-look_back-1):
            a = dataset[i:(i+look_back), 0]
            X.append(a)
            y.append(dataset[i + look_back, 0])
        return np.array(X), np.array(y)

```

```
    # create training and testing data for LSTM model
    look_back = 3
    X_train, y_train = create_dataset(train_data, look_back)
    X_test, y_test = create_dataset(test_data, look_back)

    # reshape input to be [samples, time steps, features]
    X_train = np.reshape(X_train, (X_train.shape[0], X_train.shape[1], 1))
    X_test = np.reshape(X_test, (X_test.shape[0], X_test.shape[1], 1))

    # create and train LSTM model with dropout layer
    model = Sequential()
    model.add(LSTM(50, input_shape=(look_back, 1), dropout=0.2, recurrent_dropout=0.2))
    model.add(Dense(1))
    model.compile(loss='mean_squared_error', optimizer='adam')
    model.fit(X_train, y_train, epochs=100, batch_size=1, verbose=2)

    # make predictions on test data
    y_pred = model.predict(X_test)

    # inverse transform the scaled data
    y_test = scaler.inverse_transform(y_test.reshape(-1, 1))
    y_pred = scaler.inverse_transform(y_pred)

    # evaluate model using various performance metrics
    mse = mean_squared_error(y_test, y_pred)
    rmse = sqrt(mse)
    mae = mean_absolute_error(y_test, y_pred)
    mape = np.mean(np.abs((y_test - y_pred) / y_test)) * 100
    corr = np.corrcoef(y_pred.T, y_test.T)[0, 1]
    r2 = r2_score(y_test, y_pred)
    # add the model and its performance metrics to
    models[token] = {'model': model, 'mse': mse, 'rmse': rmse, 'mae': mae, 'mape': mape, 'corr': corr, 'r2': r2}

        # plot actual vs predicted values on a subplot
    row = i // 3
    col = i % 3
    axs[row, col].plot(y_test, label='Actual')
    axs[row, col].plot(y_pred, label='Predicted')
    axs[row, col].set_title('{} Actual vs Predicted Values - Dropout Model'.format(token))
    axs[row, col].set_xlabel('Time')
    axs[row, col].set_ylabel('Price')
    axs[row, col].legend()

    # evaluate model using various performance metrics
    mse = mean_squared_error(y_test, y_pred)
    rmse = sqrt(mse)
    mae = mean_absolute_error(y_test, y_pred)
    mape = np.mean(np.abs((y_test - y_pred) / y_test)) * 100
    corr = np.corrcoef(y_pred.T, y_test.T)[0, 1]
    r2 = r2_score(y_test, y_pred)

    # add the model and its performance metrics to
    models[token] = {'model': model, 'mse': mse, 'rmse': rmse, 'mae': mae, 'mape': mape, 'corr': corr, 'r2': r2}

    # create a table to display evaluation metrics for all models
    results = pd.DataFrame(columns=['Symbol', 'MSE', 'RMSE', 'MAE', 'MAPE', 'Corr', 'R2'])
    for token, metrics in models.items():
        results = results.append({'Symbol': token,
                              'MSE': metrics['mse'],
                              'RMSE': metrics['rmse'],
                              'MAE': metrics['mae'],
                              'MAPE': metrics['mape'],
                              'Corr': metrics['corr'],
                              'R2': metrics['r2']}, ignore_index=True)

    # display results table
    print('\n\nEvaluation Metrics for All Tokens: Dropout Model')
    print(results)

# adjust subplot layout
plt.tight_layout()

# show plot
plt.show()
```

```
Epoch 1/100
2089/2089 - 8s - loss: 4.7855e-04 - 8s/epoch - 4ms/step
Epoch 2/100
2089/2089 - 8s - loss: 4.2742e-04 - 8s/epoch - 4ms/step
Epoch 3/100
2089/2089 - 7s - loss: 3.7551e-04 - 7s/epoch - 3ms/step
Epoch 4/100
2089/2089 - 8s - loss: 3.7266e-04 - 8s/epoch - 4ms/step
Epoch 5/100
2089/2089 - 8s - loss: 3.6982e-04 - 8s/epoch - 4ms/step
Epoch 6/100
2089/2089 - 6s - loss: 3.2878e-04 - 6s/epoch - 3ms/step
Epoch 7/100
2089/2089 - 7s - loss: 2.7835e-04 - 7s/epoch - 4ms/step
Epoch 8/100
2089/2089 - 6s - loss: 2.4778e-04 - 6s/epoch - 3ms/step
Epoch 9/100
2089/2089 - 7s - loss: 2.0077e-04 - 7s/epoch - 4ms/step
Epoch 10/100
2089/2089 - 6s - loss: 2.1733e-04 - 6s/epoch - 3ms/step
Epoch 11/100
2089/2089 - 7s - loss: 1.9398e-04 - 7s/epoch - 4ms/step
Epoch 12/100
2089/2089 - 7s - loss: 1.4820e-04 - 7s/epoch - 3ms/step
Epoch 13/100
2089/2089 - 7s - loss: 1.1840e-04 - 7s/epoch - 3ms/step
Epoch 14/100
2089/2089 - 7s - loss: 1.2836e-04 - 7s/epoch - 4ms/step
Epoch 15/100
2089/2089 - 7s - loss: 1.0452e-04 - 7s/epoch - 4ms/step
Epoch 16/100
2089/2089 - 7s - loss: 1.3353e-04 - 7s/epoch - 4ms/step
Epoch 17/100
2089/2089 - 6s - loss: 1.3889e-04 - 6s/epoch - 3ms/step
Epoch 18/100
2089/2089 - 7s - loss: 1.1502e-04 - 7s/epoch - 4ms/step
Epoch 19/100
2089/2089 - 6s - loss: 9.5107e-05 - 6s/epoch - 3ms/step
Epoch 20/100
2089/2089 - 8s - loss: 1.0696e-04 - 8s/epoch - 4ms/step
Epoch 21/100
2089/2089 - 7s - loss: 9.2114e-05 - 7s/epoch - 4ms/step
Epoch 22/100
2089/2089 - 7s - loss: 1.3100e-04 - 7s/epoch - 3ms/step
Epoch 23/100
2089/2089 - 8s - loss: 9.8624e-05 - 8s/epoch - 4ms/step
Epoch 24/100
2089/2089 - 7s - loss: 9.4077e-05 - 7s/epoch - 3ms/step
Epoch 25/100
2089/2089 - 8s - loss: 8.3427e-05 - 8s/epoch - 4ms/step
Epoch 26/100
2089/2089 - 7s - loss: 8.9578e-05 - 7s/epoch - 4ms/step
Epoch 27/100
2089/2089 - 7s - loss: 7.0754e-05 - 7s/epoch - 3ms/step
Epoch 28/100
2089/2089 - 8s - loss: 9.1201e-05 - 8s/epoch - 4ms/step
Epoch 29/100
2089/2089 - 6s - loss: 8.6223e-05 - 6s/epoch - 3ms/step
Epoch 30/100
2089/2089 - 8s - loss: 8.0780e-05 - 8s/epoch - 4ms/step
Epoch 31/100
2089/2089 - 7s - loss: 9.0948e-05 - 7s/epoch - 3ms/step
Epoch 32/100
2089/2089 - 8s - loss: 8.6831e-05 - 8s/epoch - 4ms/step
Epoch 33/100
2089/2089 - 7s - loss: 9.6264e-05 - 7s/epoch - 3ms/step
Epoch 34/100
2089/2089 - 8s - loss: 6.8974e-05 - 8s/epoch - 4ms/step
Epoch 35/100
2089/2089 - 8s - loss: 8.1826e-05 - 8s/epoch - 4ms/step
Epoch 36/100
2089/2089 - 7s - loss: 7.6216e-05 - 7s/epoch - 3ms/step
Epoch 37/100
2089/2089 - 9s - loss: 7.9176e-05 - 9s/epoch - 4ms/step
Epoch 38/100
2089/2089 - 9s - loss: 8.4169e-05 - 9s/epoch - 4ms/step
Epoch 39/100
2089/2089 - 7s - loss: 7.7586e-05 - 7s/epoch - 3ms/step
Epoch 40/100
2089/2089 - 8s - loss: 8.5624e-05 - 8s/epoch - 4ms/step
Epoch 41/100
2089/2089 - 7s - loss: 8.1533e-05 - 7s/epoch - 3ms/step
Epoch 42/100
2089/2089 - 8s - loss: 8.2980e-05 - 8s/epoch - 4ms/step
```

```
Epoch 43/100
2089/2089 - 8s - loss: 7.6720e-05 - 8s/epoch - 4ms/step
Epoch 44/100
2089/2089 - 7s - loss: 7.2011e-05 - 7s/epoch - 3ms/step
Epoch 45/100
2089/2089 - 8s - loss: 7.2553e-05 - 8s/epoch - 4ms/step
Epoch 46/100
2089/2089 - 7s - loss: 7.4755e-05 - 7s/epoch - 3ms/step
Epoch 47/100
2089/2089 - 8s - loss: 7.3769e-05 - 8s/epoch - 4ms/step
Epoch 48/100
2089/2089 - 7s - loss: 6.9831e-05 - 7s/epoch - 3ms/step
Epoch 49/100
2089/2089 - 7s - loss: 6.2785e-05 - 7s/epoch - 3ms/step
Epoch 50/100
2089/2089 - 8s - loss: 6.8703e-05 - 8s/epoch - 4ms/step
Epoch 51/100
2089/2089 - 7s - loss: 7.1034e-05 - 7s/epoch - 3ms/step
Epoch 52/100
2089/2089 - 8s - loss: 7.1267e-05 - 8s/epoch - 4ms/step
Epoch 53/100
2089/2089 - 7s - loss: 7.1705e-05 - 7s/epoch - 3ms/step
Epoch 54/100
2089/2089 - 8s - loss: 7.9222e-05 - 8s/epoch - 4ms/step
Epoch 55/100
2089/2089 - 8s - loss: 6.1452e-05 - 8s/epoch - 4ms/step
Epoch 56/100
2089/2089 - 7s - loss: 7.6806e-05 - 7s/epoch - 4ms/step
Epoch 57/100
2089/2089 - 9s - loss: 8.8787e-05 - 9s/epoch - 4ms/step
Epoch 58/100
2089/2089 - 10s - loss: 6.5178e-05 - 10s/epoch - 5ms/step
Epoch 59/100
2089/2089 - 8s - loss: 7.5675e-05 - 8s/epoch - 4ms/step
Epoch 60/100
2089/2089 - 9s - loss: 6.4106e-05 - 9s/epoch - 4ms/step
Epoch 61/100
2089/2089 - 8s - loss: 6.3534e-05 - 8s/epoch - 4ms/step
Epoch 62/100
2089/2089 - 7s - loss: 8.5096e-05 - 7s/epoch - 3ms/step
Epoch 63/100
2089/2089 - 8s - loss: 7.8643e-05 - 8s/epoch - 4ms/step
Epoch 64/100
2089/2089 - 7s - loss: 8.0009e-05 - 7s/epoch - 3ms/step
Epoch 65/100
2089/2089 - 7s - loss: 7.2100e-05 - 7s/epoch - 3ms/step
Epoch 66/100
2089/2089 - 8s - loss: 6.9075e-05 - 8s/epoch - 4ms/step
Epoch 67/100
2089/2089 - 8s - loss: 7.8623e-05 - 8s/epoch - 4ms/step
Epoch 68/100
2089/2089 - 8s - loss: 6.3450e-05 - 8s/epoch - 4ms/step
Epoch 69/100
2089/2089 - 7s - loss: 6.3671e-05 - 7s/epoch - 3ms/step
Epoch 70/100
2089/2089 - 7s - loss: 6.1076e-05 - 7s/epoch - 3ms/step
Epoch 71/100
2089/2089 - 8s - loss: 5.7834e-05 - 8s/epoch - 4ms/step
Epoch 72/100
2089/2089 - 7s - loss: 5.8112e-05 - 7s/epoch - 3ms/step
Epoch 73/100
2089/2089 - 8s - loss: 6.9607e-05 - 8s/epoch - 4ms/step
Epoch 74/100
2089/2089 - 10s - loss: 7.1910e-05 - 10s/epoch - 5ms/step
Epoch 75/100
2089/2089 - 8s - loss: 6.0823e-05 - 8s/epoch - 4ms/step
Epoch 76/100
2089/2089 - 8s - loss: 6.4315e-05 - 8s/epoch - 4ms/step
Epoch 77/100
2089/2089 - 7s - loss: 7.7325e-05 - 7s/epoch - 3ms/step
Epoch 78/100
2089/2089 - 8s - loss: 5.6814e-05 - 8s/epoch - 4ms/step
Epoch 79/100
2089/2089 - 7s - loss: 6.2350e-05 - 7s/epoch - 3ms/step
Epoch 80/100
2089/2089 - 7s - loss: 6.1492e-05 - 7s/epoch - 3ms/step
Epoch 81/100
2089/2089 - 8s - loss: 7.2952e-05 - 8s/epoch - 4ms/step
Epoch 82/100
2089/2089 - 6s - loss: 6.2436e-05 - 6s/epoch - 3ms/step
Epoch 83/100
2089/2089 - 8s - loss: 6.2960e-05 - 8s/epoch - 4ms/step
Epoch 84/100
2089/2089 - 7s - loss: 6.7400e-05 - 7s/epoch - 3ms/step
Epoch 85/100
```

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2089/2089 - 8s - loss: 7.0158e-05 - 8s/epoch - 4ms/step
Epoch 86/100
2089/2089 - 8s - loss: 6.2076e-05 - 8s/epoch - 4ms/step
Epoch 87/100
2089/2089 - 7s - loss: 6.2225e-05 - 7s/epoch - 3ms/step
Epoch 88/100
2089/2089 - 8s - loss: 8.0791e-05 - 8s/epoch - 4ms/step
Epoch 89/100
2089/2089 - 7s - loss: 7.1774e-05 - 7s/epoch - 3ms/step
Epoch 90/100
2089/2089 - 8s - loss: 6.1502e-05 - 8s/epoch - 4ms/step
Epoch 91/100
2089/2089 - 7s - loss: 6.1864e-05 - 7s/epoch - 3ms/step
Epoch 92/100
2089/2089 - 8s - loss: 6.2226e-05 - 8s/epoch - 4ms/step
Epoch 93/100
2089/2089 - 8s - loss: 6.1472e-05 - 8s/epoch - 4ms/step
Epoch 94/100
2089/2089 - 6s - loss: 6.3221e-05 - 6s/epoch - 3ms/step
Epoch 95/100
2089/2089 - 8s - loss: 7.5165e-05 - 8s/epoch - 4ms/step
Epoch 96/100
2089/2089 - 7s - loss: 7.3204e-05 - 7s/epoch - 3ms/step
Epoch 97/100
2089/2089 - 8s - loss: 5.7610e-05 - 8s/epoch - 4ms/step
Epoch 98/100
2089/2089 - 6s - loss: 7.1232e-05 - 6s/epoch - 3ms/step
Epoch 99/100
2089/2089 - 8s - loss: 5.2285e-05 - 8s/epoch - 4ms/step
Epoch 100/100
2089/2089 - 8s - loss: 7.2775e-05 - 8s/epoch - 4ms/step
28/28 [==============================] - 0s 2ms/step


Evaluation Metrics for All Tokens: Dropout Model
  Symbol           MSE         RMSE          MAE       MAPE      Corr  \
0    BTC  4.440758e+07  6663.901006  4190.133536  20.448176  0.995718

         R2
0  0.821533
Epoch 1/100
2089/2089 - 9s - loss: 0.0031 - 9s/epoch - 4ms/step
Epoch 2/100
2089/2089 - 8s - loss: 0.0021 - 8s/epoch - 4ms/step
Epoch 3/100
2089/2089 - 7s - loss: 0.0020 - 7s/epoch - 4ms/step
Epoch 4/100
2089/2089 - 7s - loss: 0.0022 - 7s/epoch - 3ms/step
Epoch 5/100
2089/2089 - 8s - loss: 0.0016 - 8s/epoch - 4ms/step
Epoch 6/100
2089/2089 - 7s - loss: 0.0018 - 7s/epoch - 3ms/step
Epoch 7/100
2089/2089 - 8s - loss: 0.0014 - 8s/epoch - 4ms/step
Epoch 8/100
2089/2089 - 7s - loss: 0.0015 - 7s/epoch - 3ms/step
Epoch 9/100
2089/2089 - 8s - loss: 0.0012 - 8s/epoch - 4ms/step
Epoch 10/100
2089/2089 - 8s - loss: 0.0013 - 8s/epoch - 4ms/step
Epoch 11/100
2089/2089 - 7s - loss: 8.7182e-04 - 7s/epoch - 3ms/step
Epoch 12/100
2089/2089 - 8s - loss: 8.6026e-04 - 8s/epoch - 4ms/step
Epoch 13/100
2089/2089 - 7s - loss: 9.5166e-04 - 7s/epoch - 4ms/step
Epoch 14/100
2089/2089 - 7s - loss: 9.1438e-04 - 7s/epoch - 3ms/step
Epoch 15/100
2089/2089 - 8s - loss: 8.3071e-04 - 8s/epoch - 4ms/step
Epoch 16/100
2089/2089 - 7s - loss: 8.4764e-04 - 7s/epoch - 3ms/step
Epoch 17/100
2089/2089 - 8s - loss: 8.9681e-04 - 8s/epoch - 4ms/step
Epoch 18/100
2089/2089 - 7s - loss: 8.0885e-04 - 7s/epoch - 3ms/step
Epoch 19/100
2089/2089 - 8s - loss: 7.0936e-04 - 8s/epoch - 4ms/step
Epoch 20/100
2089/2089 - 8s - loss: 8.6342e-04 - 8s/epoch - 4ms/step
Epoch 21/100
2089/2089 - 7s - loss: 7.1389e-04 - 7s/epoch - 3ms/step
Epoch 22/100
2089/2089 - 8s - loss: 9.4195e-04 - 8s/epoch - 4ms/step
Epoch 23/100
```

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Epoch 23/100
2089/2089 - 7s - loss: 6.7298e-04 - 7s/epoch - 3ms/step
Epoch 24/100
2089/2089 - 8s - loss: 6.1290e-04 - 8s/epoch - 4ms/step
Epoch 25/100
2089/2089 - 7s - loss: 7.3362e-04 - 7s/epoch - 4ms/step
Epoch 26/100
2089/2089 - 7s - loss: 6.3547e-04 - 7s/epoch - 3ms/step
Epoch 27/100
2089/2089 - 8s - loss: 6.6124e-04 - 8s/epoch - 4ms/step
Epoch 28/100
2089/2089 - 7s - loss: 6.8823e-04 - 7s/epoch - 3ms/step
Epoch 29/100
2089/2089 - 8s - loss: 7.1454e-04 - 8s/epoch - 4ms/step
Epoch 30/100
2089/2089 - 8s - loss: 6.6459e-04 - 8s/epoch - 4ms/step
Epoch 31/100
2089/2089 - 7s - loss: 6.6122e-04 - 7s/epoch - 3ms/step
Epoch 32/100
2089/2089 - 8s - loss: 5.5624e-04 - 8s/epoch - 4ms/step
Epoch 33/100
2089/2089 - 7s - loss: 6.3927e-04 - 7s/epoch - 3ms/step
Epoch 34/100
2089/2089 - 8s - loss: 6.2161e-04 - 8s/epoch - 4ms/step
Epoch 35/100
2089/2089 - 7s - loss: 7.4989e-04 - 7s/epoch - 3ms/step
Epoch 36/100
2089/2089 - 8s - loss: 6.7713e-04 - 8s/epoch - 4ms/step
Epoch 37/100
2089/2089 - 8s - loss: 5.7296e-04 - 8s/epoch - 4ms/step
Epoch 38/100
2089/2089 - 7s - loss: 6.8926e-04 - 7s/epoch - 3ms/step
Epoch 39/100
2089/2089 - 8s - loss: 6.7442e-04 - 8s/epoch - 4ms/step
Epoch 40/100
2089/2089 - 7s - loss: 6.9120e-04 - 7s/epoch - 3ms/step
Epoch 41/100
2089/2089 - 8s - loss: 6.8107e-04 - 8s/epoch - 4ms/step
Epoch 42/100
2089/2089 - 8s - loss: 5.4276e-04 - 8s/epoch - 4ms/step
Epoch 43/100
2089/2089 - 7s - loss: 5.9425e-04 - 7s/epoch - 3ms/step
Epoch 44/100
2089/2089 - 8s - loss: 5.8402e-04 - 8s/epoch - 4ms/step
Epoch 45/100
2089/2089 - 7s - loss: 6.8293e-04 - 7s/epoch - 3ms/step
Epoch 46/100
2089/2089 - 8s - loss: 6.5612e-04 - 8s/epoch - 4ms/step
Epoch 47/100
2089/2089 - 7s - loss: 4.9227e-04 - 7s/epoch - 3ms/step
Epoch 48/100
2089/2089 - 8s - loss: 5.6643e-04 - 8s/epoch - 4ms/step
Epoch 49/100
2089/2089 - 8s - loss: 6.6832e-04 - 8s/epoch - 4ms/step
Epoch 50/100
2089/2089 - 7s - loss: 6.0845e-04 - 7s/epoch - 3ms/step
Epoch 51/100
2089/2089 - 8s - loss: 5.6178e-04 - 8s/epoch - 4ms/step
Epoch 52/100
2089/2089 - 7s - loss: 5.4477e-04 - 7s/epoch - 3ms/step
Epoch 53/100
2089/2089 - 8s - loss: 5.4403e-04 - 8s/epoch - 4ms/step
Epoch 54/100
2089/2089 - 8s - loss: 5.9422e-04 - 8s/epoch - 4ms/step
Epoch 55/100
2089/2089 - 7s - loss: 6.0081e-04 - 7s/epoch - 3ms/step
Epoch 56/100
2089/2089 - 8s - loss: 4.9906e-04 - 8s/epoch - 4ms/step
Epoch 57/100
2089/2089 - 7s - loss: 5.3539e-04 - 7s/epoch - 3ms/step
Epoch 58/100
2089/2089 - 8s - loss: 5.1315e-04 - 8s/epoch - 4ms/step
Epoch 59/100
2089/2089 - 7s - loss: 5.4696e-04 - 7s/epoch - 3ms/step
Epoch 60/100
2089/2089 - 8s - loss: 5.0244e-04 - 8s/epoch - 4ms/step
Epoch 61/100
2089/2089 - 8s - loss: 5.6432e-04 - 8s/epoch - 4ms/step
Epoch 62/100
2089/2089 - 7s - loss: 4.7225e-04 - 7s/epoch - 3ms/step
Epoch 63/100
2089/2089 - 8s - loss: 5.3603e-04 - 8s/epoch - 4ms/step
Epoch 64/100
2089/2089 - 7s - loss: 6.8705e-04 - 7s/epoch - 4ms/step
Epoch 65/100
```

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2089/2089 - 8s - loss: 4.9515e-04 - 8s/epoch - 4ms/step
Epoch 66/100
2089/2089 - 8s - loss: 5.1222e-04 - 8s/epoch - 4ms/step
Epoch 67/100
2089/2089 - 8s - loss: 4.9329e-04 - 8s/epoch - 4ms/step
Epoch 68/100
2089/2089 - 8s - loss: 4.2517e-04 - 8s/epoch - 4ms/step
Epoch 69/100
2089/2089 - 8s - loss: 4.9752e-04 - 8s/epoch - 4ms/step
Epoch 70/100
2089/2089 - 7s - loss: 5.3208e-04 - 7s/epoch - 3ms/step
Epoch 71/100
2089/2089 - 8s - loss: 4.2235e-04 - 8s/epoch - 4ms/step
Epoch 72/100
2089/2089 - 7s - loss: 4.6010e-04 - 7s/epoch - 3ms/step
Epoch 73/100
2089/2089 - 8s - loss: 4.6187e-04 - 8s/epoch - 4ms/step
Epoch 74/100
2089/2089 - 8s - loss: 4.5989e-04 - 8s/epoch - 4ms/step
Epoch 75/100
2089/2089 - 7s - loss: 4.5322e-04 - 7s/epoch - 3ms/step
Epoch 76/100
2089/2089 - 8s - loss: 3.9993e-04 - 8s/epoch - 4ms/step
Epoch 77/100
2089/2089 - 7s - loss: 4.3439e-04 - 7s/epoch - 3ms/step
Epoch 78/100
2089/2089 - 8s - loss: 5.2900e-04 - 8s/epoch - 4ms/step
Epoch 79/100
2089/2089 - 8s - loss: 4.3941e-04 - 8s/epoch - 4ms/step
Epoch 80/100
2089/2089 - 7s - loss: 4.3745e-04 - 7s/epoch - 3ms/step
Epoch 81/100
2089/2089 - 8s - loss: 4.5430e-04 - 8s/epoch - 4ms/step
Epoch 82/100
2089/2089 - 8s - loss: 4.5240e-04 - 8s/epoch - 4ms/step
Epoch 83/100
2089/2089 - 7s - loss: 3.7329e-04 - 7s/epoch - 4ms/step
Epoch 84/100
2089/2089 - 8s - loss: 4.0072e-04 - 8s/epoch - 4ms/step
Epoch 85/100
2089/2089 - 7s - loss: 4.0672e-04 - 7s/epoch - 3ms/step
Epoch 86/100
2089/2089 - 8s - loss: 4.9697e-04 - 8s/epoch - 4ms/step
Epoch 87/100
2089/2089 - 7s - loss: 4.3305e-04 - 7s/epoch - 3ms/step
Epoch 88/100
2089/2089 - 8s - loss: 4.3743e-04 - 8s/epoch - 4ms/step
Epoch 89/100
2089/2089 - 8s - loss: 3.9134e-04 - 8s/epoch - 4ms/step
Epoch 90/100
2089/2089 - 7s - loss: 3.3908e-04 - 7s/epoch - 3ms/step
Epoch 91/100
2089/2089 - 8s - loss: 3.7455e-04 - 8s/epoch - 4ms/step
Epoch 92/100
2089/2089 - 7s - loss: 3.9637e-04 - 7s/epoch - 4ms/step
Epoch 93/100
2089/2089 - 8s - loss: 4.0453e-04 - 8s/epoch - 4ms/step
Epoch 94/100
2089/2089 - 8s - loss: 4.0155e-04 - 8s/epoch - 4ms/step
Epoch 95/100
2089/2089 - 7s - loss: 3.6290e-04 - 7s/epoch - 3ms/step
Epoch 96/100
2089/2089 - 8s - loss: 4.1522e-04 - 8s/epoch - 4ms/step
Epoch 97/100
2089/2089 - 7s - loss: 3.6149e-04 - 7s/epoch - 3ms/step
Epoch 98/100
2089/2089 - 9s - loss: 4.1228e-04 - 9s/epoch - 4ms/step
Epoch 99/100
2089/2089 - 8s - loss: 3.7419e-04 - 8s/epoch - 4ms/step
Epoch 100/100
2089/2089 - 8s - loss: 3.7267e-04 - 8s/epoch - 4ms/step
28/28 [==============================] - 0s 2ms/step


Evaluation Metrics for All Tokens: Dropout Model
  Symbol           MSE         RMSE          MAE       MAPE      Corr  \
0    BTC  4.440758e+07  6663.901006  4190.133536  20.448176  0.995718
1    LTC  4.510385e+02    21.237668    15.172627  14.658835  0.991060

         R2
0  0.821533
1  0.889541
Epoch 1/100
2021/2021 - 9s - loss: 0.0017 - 9s/epoch - 5ms/step
Epoch 2/100
```

```
2021/2021 - 8s - loss: 0.0016 - 8s/epoch - 4ms/step
Epoch 3/100
2021/2021 - 7s - loss: 0.0016 - 7s/epoch - 3ms/step
Epoch 4/100
2021/2021 - 8s - loss: 0.0014 - 8s/epoch - 4ms/step
Epoch 5/100
2021/2021 - 7s - loss: 0.0015 - 7s/epoch - 4ms/step
Epoch 6/100
2021/2021 - 8s - loss: 0.0010 - 8s/epoch - 4ms/step
Epoch 7/100
2021/2021 - 9s - loss: 0.0010 - 9s/epoch - 4ms/step
Epoch 8/100
2021/2021 - 7s - loss: 0.0012 - 7s/epoch - 4ms/step
Epoch 9/100
2021/2021 - 8s - loss: 0.0013 - 8s/epoch - 4ms/step
Epoch 10/100
2021/2021 - 8s - loss: 9.8589e-04 - 8s/epoch - 4ms/step
Epoch 11/100
2021/2021 - 7s - loss: 9.1998e-04 - 7s/epoch - 3ms/step
Epoch 12/100
2021/2021 - 8s - loss: 9.1081e-04 - 8s/epoch - 4ms/step
Epoch 13/100
2021/2021 - 7s - loss: 6.6351e-04 - 7s/epoch - 3ms/step
Epoch 14/100
2021/2021 - 8s - loss: 8.4758e-04 - 8s/epoch - 4ms/step
Epoch 15/100
2021/2021 - 8s - loss: 9.1331e-04 - 8s/epoch - 4ms/step
Epoch 16/100
2021/2021 - 7s - loss: 7.5698e-04 - 7s/epoch - 3ms/step
Epoch 17/100
2021/2021 - 8s - loss: 6.4272e-04 - 8s/epoch - 4ms/step
Epoch 18/100
2021/2021 - 7s - loss: 7.3309e-04 - 7s/epoch - 3ms/step
Epoch 19/100
2021/2021 - 8s - loss: 6.4499e-04 - 8s/epoch - 4ms/step
Epoch 20/100
2021/2021 - 8s - loss: 8.7257e-04 - 8s/epoch - 4ms/step
Epoch 21/100
2021/2021 - 7s - loss: 6.7182e-04 - 7s/epoch - 4ms/step
Epoch 22/100
2021/2021 - 9s - loss: 7.0326e-04 - 9s/epoch - 4ms/step
Epoch 23/100
2021/2021 - 8s - loss: 7.2131e-04 - 8s/epoch - 4ms/step
Epoch 24/100
2021/2021 - 7s - loss: 8.7381e-04 - 7s/epoch - 3ms/step
Epoch 25/100
2021/2021 - 8s - loss: 5.5619e-04 - 8s/epoch - 4ms/step
Epoch 26/100
2021/2021 - 7s - loss: 6.4483e-04 - 7s/epoch - 3ms/step
Epoch 27/100
2021/2021 - 8s - loss: 6.8731e-04 - 8s/epoch - 4ms/step
Epoch 28/100
2021/2021 - 7s - loss: 5.9561e-04 - 7s/epoch - 4ms/step
Epoch 29/100
2021/2021 - 7s - loss: 5.4101e-04 - 7s/epoch - 4ms/step
Epoch 30/100
2021/2021 - 8s - loss: 6.3201e-04 - 8s/epoch - 4ms/step
Epoch 31/100
2021/2021 - 7s - loss: 5.5749e-04 - 7s/epoch - 3ms/step
Epoch 32/100
2021/2021 - 8s - loss: 6.9220e-04 - 8s/epoch - 4ms/step
Epoch 33/100
2021/2021 - 7s - loss: 5.1182e-04 - 7s/epoch - 3ms/step
Epoch 34/100
2021/2021 - 8s - loss: 6.8193e-04 - 8s/epoch - 4ms/step
Epoch 35/100
2021/2021 - 8s - loss: 6.1473e-04 - 8s/epoch - 4ms/step
Epoch 36/100
2021/2021 - 7s - loss: 4.8487e-04 - 7s/epoch - 3ms/step
Epoch 37/100
2021/2021 - 7s - loss: 5.8371e-04 - 7s/epoch - 4ms/step
Epoch 38/100
2021/2021 - 7s - loss: 6.3080e-04 - 7s/epoch - 3ms/step
Epoch 39/100
2021/2021 - 8s - loss: 6.7870e-04 - 8s/epoch - 4ms/step
Epoch 40/100
2021/2021 - 8s - loss: 6.7771e-04 - 8s/epoch - 4ms/step
Epoch 41/100
2021/2021 - 7s - loss: 4.6483e-04 - 7s/epoch - 3ms/step
Epoch 42/100
2021/2021 - 8s - loss: 7.5892e-04 - 8s/epoch - 4ms/step
Epoch 43/100
2021/2021 - 7s - loss: 5.9920e-04 - 7s/epoch - 3ms/step
Epoch 44/100
2021/2021 - 8s - loss: 5.5336e-04 - 8s/epoch - 4ms/step
```

```
Epoch 45/100
2021/2021 - 7s - loss: 5.8238e-04 - 7s/epoch - 3ms/step
Epoch 46/100
2021/2021 - 8s - loss: 4.4023e-04 - 8s/epoch - 4ms/step
Epoch 47/100
2021/2021 - 8s - loss: 4.7141e-04 - 8s/epoch - 4ms/step
Epoch 48/100
2021/2021 - 7s - loss: 6.2140e-04 - 7s/epoch - 3ms/step
Epoch 49/100
2021/2021 - 8s - loss: 5.4634e-04 - 8s/epoch - 4ms/step
Epoch 50/100
2021/2021 - 7s - loss: 5.9192e-04 - 7s/epoch - 3ms/step
Epoch 51/100
2021/2021 - 8s - loss: 4.6180e-04 - 8s/epoch - 4ms/step
Epoch 52/100
2021/2021 - 8s - loss: 5.7686e-04 - 8s/epoch - 4ms/step
Epoch 53/100
2021/2021 - 7s - loss: 5.4963e-04 - 7s/epoch - 3ms/step
Epoch 54/100
2021/2021 - 8s - loss: 5.7688e-04 - 8s/epoch - 4ms/step
Epoch 55/100
2021/2021 - 7s - loss: 6.1294e-04 - 7s/epoch - 3ms/step
Epoch 56/100
2021/2021 - 8s - loss: 5.9770e-04 - 8s/epoch - 4ms/step
Epoch 57/100
2021/2021 - 8s - loss: 4.5497e-04 - 8s/epoch - 4ms/step
Epoch 58/100
2021/2021 - 7s - loss: 5.3790e-04 - 7s/epoch - 3ms/step
Epoch 59/100
2021/2021 - 8s - loss: 5.2376e-04 - 8s/epoch - 4ms/step
Epoch 60/100
2021/2021 - 7s - loss: 5.1065e-04 - 7s/epoch - 3ms/step
Epoch 61/100
2021/2021 - 8s - loss: 5.6733e-04 - 8s/epoch - 4ms/step
Epoch 62/100
2021/2021 - 7s - loss: 5.9388e-04 - 7s/epoch - 3ms/step
Epoch 63/100
2021/2021 - 7s - loss: 4.9069e-04 - 7s/epoch - 4ms/step
Epoch 64/100
2021/2021 - 8s - loss: 5.0076e-04 - 8s/epoch - 4ms/step
Epoch 65/100
2021/2021 - 7s - loss: 5.0885e-04 - 7s/epoch - 3ms/step
Epoch 66/100
2021/2021 - 7s - loss: 5.3669e-04 - 7s/epoch - 4ms/step
Epoch 67/100
2021/2021 - 6s - loss: 5.4609e-04 - 6s/epoch - 3ms/step
Epoch 68/100
2021/2021 - 7s - loss: 5.7100e-04 - 7s/epoch - 4ms/step
Epoch 69/100
2021/2021 - 6s - loss: 5.1628e-04 - 6s/epoch - 3ms/step
Epoch 70/100
2021/2021 - 7s - loss: 4.7712e-04 - 7s/epoch - 4ms/step
Epoch 71/100
2021/2021 - 7s - loss: 4.0199e-04 - 7s/epoch - 3ms/step
Epoch 72/100
2021/2021 - 8s - loss: 5.1169e-04 - 8s/epoch - 4ms/step
Epoch 73/100
2021/2021 - 8s - loss: 4.9485e-04 - 8s/epoch - 4ms/step
Epoch 74/100
2021/2021 - 6s - loss: 4.3472e-04 - 6s/epoch - 3ms/step
Epoch 75/100
2021/2021 - 7s - loss: 4.9427e-04 - 7s/epoch - 4ms/step
Epoch 76/100
2021/2021 - 6s - loss: 5.5487e-04 - 6s/epoch - 3ms/step
Epoch 77/100
2021/2021 - 8s - loss: 4.5785e-04 - 8s/epoch - 4ms/step
Epoch 78/100
2021/2021 - 7s - loss: 4.5682e-04 - 7s/epoch - 3ms/step
Epoch 79/100
2021/2021 - 7s - loss: 5.4825e-04 - 7s/epoch - 4ms/step
Epoch 80/100
2021/2021 - 7s - loss: 4.2639e-04 - 7s/epoch - 3ms/step
Epoch 81/100
2021/2021 - 7s - loss: 3.6674e-04 - 7s/epoch - 3ms/step
Epoch 82/100
2021/2021 - 8s - loss: 3.8890e-04 - 8s/epoch - 4ms/step
Epoch 83/100
2021/2021 - 6s - loss: 3.2231e-04 - 6s/epoch - 3ms/step
Epoch 84/100
2021/2021 - 7s - loss: 4.7006e-04 - 7s/epoch - 4ms/step
Epoch 85/100
2021/2021 - 6s - loss: 3.6616e-04 - 6s/epoch - 3ms/step
Epoch 86/100
2021/2021 - 8s - loss: 3.8593e-04 - 8s/epoch - 4ms/step
```

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Epoch 87/100
2021/2021 - 7s - loss: 4.3542e-04 - 7s/epoch - 3ms/step
Epoch 88/100
2021/2021 - 8s - loss: 4.0819e-04 - 8s/epoch - 4ms/step
Epoch 89/100
2021/2021 - 8s - loss: 4.1219e-04 - 8s/epoch - 4ms/step
Epoch 90/100
2021/2021 - 6s - loss: 4.1914e-04 - 6s/epoch - 3ms/step
Epoch 91/100
2021/2021 - 8s - loss: 4.9244e-04 - 8s/epoch - 4ms/step
Epoch 92/100
2021/2021 - 7s - loss: 4.5595e-04 - 7s/epoch - 4ms/step
Epoch 93/100
2021/2021 - 8s - loss: 4.4746e-04 - 8s/epoch - 4ms/step
Epoch 94/100
2021/2021 - 8s - loss: 5.5142e-04 - 8s/epoch - 4ms/step
Epoch 95/100
2021/2021 - 7s - loss: 3.7214e-04 - 7s/epoch - 4ms/step
Epoch 96/100
2021/2021 - 8s - loss: 4.4784e-04 - 8s/epoch - 4ms/step
Epoch 97/100
2021/2021 - 7s - loss: 3.6881e-04 - 7s/epoch - 4ms/step
Epoch 98/100
2021/2021 - 8s - loss: 3.7581e-04 - 8s/epoch - 4ms/step
Epoch 99/100
2021/2021 - 7s - loss: 3.5475e-04 - 7s/epoch - 4ms/step
Epoch 100/100
2021/2021 - 7s - loss: 4.4199e-04 - 7s/epoch - 3ms/step
27/27 [==============================] - 0s 2ms/step


Evaluation Metrics for All Tokens: Dropout Model
  Symbol           MSE         RMSE          MAE       MAPE      Corr  \
0    BTC  4.440758e+07  6663.901006  4190.133536  20.448176  0.995718
1    LTC  4.510385e+02    21.237668    15.172627  14.658835  0.991060
2    XRP  3.606725e-03     0.060056     0.025499   4.578688  0.985541

         R2
0  0.821533
1  0.889541
2  0.957239
Epoch 1/100
1508/1508 - 8s - loss: 7.9892e-04 - 8s/epoch - 5ms/step
Epoch 2/100
1508/1508 - 5s - loss: 6.1351e-04 - 5s/epoch - 3ms/step
Epoch 3/100
1508/1508 - 6s - loss: 5.2534e-04 - 6s/epoch - 4ms/step
Epoch 4/100
1508/1508 - 5s - loss: 4.3455e-04 - 5s/epoch - 3ms/step
Epoch 5/100
1508/1508 - 5s - loss: 5.6487e-04 - 5s/epoch - 3ms/step
Epoch 6/100
1508/1508 - 6s - loss: 3.7405e-04 - 6s/epoch - 4ms/step
Epoch 7/100
1508/1508 - 6s - loss: 4.8017e-04 - 6s/epoch - 4ms/step
Epoch 8/100
1508/1508 - 7s - loss: 4.1752e-04 - 7s/epoch - 4ms/step
Epoch 9/100
1508/1508 - 5s - loss: 4.3209e-04 - 5s/epoch - 3ms/step
Epoch 10/100
1508/1508 - 6s - loss: 2.9642e-04 - 6s/epoch - 4ms/step
Epoch 11/100
1508/1508 - 5s - loss: 2.8236e-04 - 5s/epoch - 3ms/step
Epoch 12/100
1508/1508 - 6s - loss: 2.8373e-04 - 6s/epoch - 4ms/step
Epoch 13/100
1508/1508 - 5s - loss: 2.5009e-04 - 5s/epoch - 3ms/step
Epoch 14/100
1508/1508 - 5s - loss: 2.5705e-04 - 5s/epoch - 3ms/step
Epoch 15/100
1508/1508 - 5s - loss: 2.7423e-04 - 5s/epoch - 4ms/step
Epoch 16/100
1508/1508 - 5s - loss: 2.4238e-04 - 5s/epoch - 3ms/step
Epoch 17/100
1508/1508 - 6s - loss: 2.0366e-04 - 6s/epoch - 4ms/step
Epoch 18/100
1508/1508 - 6s - loss: 2.3549e-04 - 6s/epoch - 4ms/step
Epoch 19/100
1508/1508 - 6s - loss: 2.2028e-04 - 6s/epoch - 4ms/step
Epoch 20/100
1508/1508 - 5s - loss: 1.9654e-04 - 5s/epoch - 3ms/step
Epoch 21/100
1508/1508 - 6s - loss: 1.9263e-04 - 6s/epoch - 4ms/step
Epoch 22/100
1508/1508 - 5s - loss: 2.2920e-04 - 5s/epoch - 3ms/step
```

```
Epoch 23/100
1508/1508 - 6s - loss: 2.0150e-04 - 6s/epoch - 4ms/step
Epoch 24/100
1508/1508 - 6s - loss: 1.7753e-04 - 6s/epoch - 4ms/step
Epoch 25/100
1508/1508 - 6s - loss: 1.7071e-04 - 6s/epoch - 4ms/step
Epoch 26/100
1508/1508 - 6s - loss: 1.3511e-04 - 6s/epoch - 4ms/step
Epoch 27/100
1508/1508 - 5s - loss: 1.8072e-04 - 5s/epoch - 3ms/step
Epoch 28/100
1508/1508 - 6s - loss: 1.9202e-04 - 6s/epoch - 4ms/step
Epoch 29/100
1508/1508 - 5s - loss: 1.4127e-04 - 5s/epoch - 3ms/step
Epoch 30/100
1508/1508 - 6s - loss: 1.5501e-04 - 6s/epoch - 4ms/step
Epoch 31/100
1508/1508 - 5s - loss: 1.7047e-04 - 5s/epoch - 4ms/step
Epoch 32/100
1508/1508 - 6s - loss: 1.3340e-04 - 6s/epoch - 4ms/step
Epoch 33/100
1508/1508 - 5s - loss: 1.2507e-04 - 5s/epoch - 3ms/step
Epoch 34/100
1508/1508 - 6s - loss: 1.5684e-04 - 6s/epoch - 4ms/step
Epoch 35/100
1508/1508 - 6s - loss: 1.2968e-04 - 6s/epoch - 4ms/step
Epoch 36/100
1508/1508 - 6s - loss: 1.8209e-04 - 6s/epoch - 4ms/step
Epoch 37/100
1508/1508 - 6s - loss: 1.2964e-04 - 6s/epoch - 4ms/step
Epoch 38/100
1508/1508 - 5s - loss: 1.6083e-04 - 5s/epoch - 3ms/step
Epoch 39/100
1508/1508 - 6s - loss: 1.4091e-04 - 6s/epoch - 4ms/step
Epoch 40/100
1508/1508 - 5s - loss: 1.8160e-04 - 5s/epoch - 3ms/step
Epoch 41/100
1508/1508 - 5s - loss: 1.2767e-04 - 5s/epoch - 3ms/step
Epoch 42/100
1508/1508 - 5s - loss: 1.5410e-04 - 5s/epoch - 3ms/step
Epoch 43/100
1508/1508 - 5s - loss: 1.5480e-04 - 5s/epoch - 3ms/step
Epoch 44/100
1508/1508 - 6s - loss: 1.2224e-04 - 6s/epoch - 4ms/step
Epoch 45/100
1508/1508 - 5s - loss: 1.2519e-04 - 5s/epoch - 3ms/step
Epoch 46/100
1508/1508 - 6s - loss: 1.2245e-04 - 6s/epoch - 4ms/step
Epoch 47/100
1508/1508 - 5s - loss: 1.3573e-04 - 5s/epoch - 3ms/step
Epoch 48/100
1508/1508 - 5s - loss: 1.4320e-04 - 5s/epoch - 3ms/step
Epoch 49/100
1508/1508 - 6s - loss: 1.2828e-04 - 6s/epoch - 4ms/step
Epoch 50/100
1508/1508 - 5s - loss: 1.1906e-04 - 5s/epoch - 3ms/step
Epoch 51/100
1508/1508 - 6s - loss: 1.3213e-04 - 6s/epoch - 4ms/step
Epoch 52/100
1508/1508 - 5s - loss: 1.2616e-04 - 5s/epoch - 3ms/step
Epoch 53/100
1508/1508 - 5s - loss: 1.2633e-04 - 5s/epoch - 3ms/step
Epoch 54/100
1508/1508 - 6s - loss: 1.2866e-04 - 6s/epoch - 4ms/step
Epoch 55/100
1508/1508 - 5s - loss: 1.3841e-04 - 5s/epoch - 3ms/step
Epoch 56/100
1508/1508 - 6s - loss: 1.1786e-04 - 6s/epoch - 4ms/step
Epoch 57/100
1508/1508 - 5s - loss: 1.0098e-04 - 5s/epoch - 3ms/step
Epoch 58/100
1508/1508 - 5s - loss: 1.3414e-04 - 5s/epoch - 3ms/step
Epoch 59/100
1508/1508 - 6s - loss: 1.1370e-04 - 6s/epoch - 4ms/step
Epoch 60/100
1508/1508 - 5s - loss: 1.1955e-04 - 5s/epoch - 3ms/step
Epoch 61/100
1508/1508 - 6s - loss: 1.1637e-04 - 6s/epoch - 4ms/step
Epoch 62/100
1508/1508 - 5s - loss: 1.1044e-04 - 5s/epoch - 3ms/step
Epoch 63/100
1508/1508 - 5s - loss: 1.0810e-04 - 5s/epoch - 3ms/step
Epoch 64/100
1508/1508 - 6s - loss: 1.3456e-04 - 6s/epoch - 4ms/step
Epoch 65/100
```

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1508/1508 - 5s - loss: 1.2463e-04 - 5s/epoch - 3ms/step
Epoch 66/100
1508/1508 - 6s - loss: 1.2894e-04 - 6s/epoch - 4ms/step
Epoch 67/100
1508/1508 - 5s - loss: 1.1247e-04 - 5s/epoch - 3ms/step
Epoch 68/100
1508/1508 - 5s - loss: 1.2088e-04 - 5s/epoch - 3ms/step
Epoch 69/100
1508/1508 - 6s - loss: 1.1119e-04 - 6s/epoch - 4ms/step
Epoch 70/100
1508/1508 - 5s - loss: 1.0945e-04 - 5s/epoch - 3ms/step
Epoch 71/100
1508/1508 - 6s - loss: 1.3296e-04 - 6s/epoch - 4ms/step
Epoch 72/100
1508/1508 - 5s - loss: 1.0727e-04 - 5s/epoch - 4ms/step
Epoch 73/100
1508/1508 - 6s - loss: 1.1417e-04 - 6s/epoch - 4ms/step
Epoch 74/100
1508/1508 - 5s - loss: 1.1088e-04 - 5s/epoch - 3ms/step
Epoch 75/100
1508/1508 - 5s - loss: 1.0502e-04 - 5s/epoch - 3ms/step
Epoch 76/100
1508/1508 - 6s - loss: 1.0759e-04 - 6s/epoch - 4ms/step
Epoch 77/100
1508/1508 - 5s - loss: 1.1954e-04 - 5s/epoch - 3ms/step
Epoch 78/100
1508/1508 - 6s - loss: 1.0011e-04 - 6s/epoch - 4ms/step
Epoch 79/100
1508/1508 - 5s - loss: 1.1224e-04 - 5s/epoch - 3ms/step
Epoch 80/100
1508/1508 - 5s - loss: 1.0769e-04 - 5s/epoch - 3ms/step
Epoch 81/100
1508/1508 - 5s - loss: 1.1721e-04 - 5s/epoch - 3ms/step
Epoch 82/100
1508/1508 - 5s - loss: 1.1088e-04 - 5s/epoch - 3ms/step
Epoch 83/100
1508/1508 - 6s - loss: 1.1719e-04 - 6s/epoch - 4ms/step
Epoch 84/100
1508/1508 - 5s - loss: 1.0921e-04 - 5s/epoch - 3ms/step
Epoch 85/100
1508/1508 - 5s - loss: 1.0421e-04 - 5s/epoch - 3ms/step
Epoch 86/100
1508/1508 - 5s - loss: 1.0851e-04 - 5s/epoch - 3ms/step
Epoch 87/100
1508/1508 - 5s - loss: 9.6370e-05 - 5s/epoch - 3ms/step
Epoch 88/100
1508/1508 - 5s - loss: 1.1943e-04 - 5s/epoch - 4ms/step
Epoch 89/100
1508/1508 - 5s - loss: 1.1432e-04 - 5s/epoch - 3ms/step
Epoch 90/100
1508/1508 - 5s - loss: 1.0837e-04 - 5s/epoch - 3ms/step
Epoch 91/100
1508/1508 - 5s - loss: 1.0174e-04 - 5s/epoch - 4ms/step
Epoch 92/100
1508/1508 - 5s - loss: 1.0878e-04 - 5s/epoch - 3ms/step
Epoch 93/100
1508/1508 - 6s - loss: 1.1268e-04 - 6s/epoch - 4ms/step
Epoch 94/100
1508/1508 - 5s - loss: 1.0314e-04 - 5s/epoch - 3ms/step
Epoch 95/100
1508/1508 - 5s - loss: 1.0516e-04 - 5s/epoch - 3ms/step
Epoch 96/100
1508/1508 - 5s - loss: 9.0898e-05 - 5s/epoch - 4ms/step
Epoch 97/100
1508/1508 - 5s - loss: 1.1184e-04 - 5s/epoch - 3ms/step
Epoch 98/100
1508/1508 - 6s - loss: 1.2035e-04 - 6s/epoch - 4ms/step
Epoch 99/100
1508/1508 - 5s - loss: 1.0090e-04 - 5s/epoch - 3ms/step
Epoch 100/100
1508/1508 - 6s - loss: 8.8094e-05 - 6s/epoch - 4ms/step
21/21 [==============================] - 0s 2ms/step


Evaluation Metrics for All Tokens: Dropout Model
  Symbol           MSE         RMSE          MAE       MAPE      Corr  \
0    BTC  4.440758e+07  6663.901006  4190.133536  20.448176  0.995718
1    LTC  4.510385e+02    21.237668    15.172627  14.658835  0.991060
2    XRP  3.606725e-03     0.060056     0.025499   4.578688  0.985541
3    ETH  1.074715e+05   327.828389   169.389246  13.178135  0.991019

         R2
0  0.821533
1  0.889541
```

```
2  0.957239
3  0.867830
Epoch 1/100
697/697 - 5s - loss: 0.0144 - 5s/epoch - 7ms/step
Epoch 2/100
697/697 - 3s - loss: 0.0092 - 3s/epoch - 4ms/step
Epoch 3/100
697/697 - 2s - loss: 0.0091 - 2s/epoch - 3ms/step
Epoch 4/100
697/697 - 2s - loss: 0.0079 - 2s/epoch - 3ms/step
Epoch 5/100
697/697 - 2s - loss: 0.0080 - 2s/epoch - 3ms/step
Epoch 6/100
697/697 - 2s - loss: 0.0083 - 2s/epoch - 3ms/step
Epoch 7/100
697/697 - 3s - loss: 0.0082 - 3s/epoch - 5ms/step
Epoch 8/100
697/697 - 2s - loss: 0.0081 - 2s/epoch - 3ms/step
Epoch 9/100
697/697 - 2s - loss: 0.0079 - 2s/epoch - 3ms/step
Epoch 10/100
697/697 - 2s - loss: 0.0077 - 2s/epoch - 3ms/step
Epoch 11/100
697/697 - 2s - loss: 0.0078 - 2s/epoch - 3ms/step
Epoch 12/100
697/697 - 3s - loss: 0.0072 - 3s/epoch - 5ms/step
Epoch 13/100
697/697 - 2s - loss: 0.0076 - 2s/epoch - 3ms/step
Epoch 14/100
697/697 - 2s - loss: 0.0078 - 2s/epoch - 3ms/step
Epoch 15/100
697/697 - 2s - loss: 0.0075 - 2s/epoch - 3ms/step
Epoch 16/100
697/697 - 2s - loss: 0.0074 - 2s/epoch - 3ms/step
Epoch 17/100
697/697 - 3s - loss: 0.0078 - 3s/epoch - 5ms/step
Epoch 18/100
697/697 - 2s - loss: 0.0074 - 2s/epoch - 3ms/step
Epoch 19/100
697/697 - 2s - loss: 0.0072 - 2s/epoch - 3ms/step
Epoch 20/100
697/697 - 2s - loss: 0.0078 - 2s/epoch - 3ms/step
Epoch 21/100
697/697 - 2s - loss: 0.0071 - 2s/epoch - 3ms/step
Epoch 22/100
697/697 - 3s - loss: 0.0074 - 3s/epoch - 4ms/step
Epoch 23/100
697/697 - 3s - loss: 0.0073 - 3s/epoch - 4ms/step
Epoch 24/100
697/697 - 2s - loss: 0.0071 - 2s/epoch - 3ms/step
Epoch 25/100
697/697 - 2s - loss: 0.0078 - 2s/epoch - 3ms/step
Epoch 26/100
697/697 - 2s - loss: 0.0072 - 2s/epoch - 3ms/step
Epoch 27/100
697/697 - 2s - loss: 0.0072 - 2s/epoch - 3ms/step
Epoch 28/100
697/697 - 3s - loss: 0.0073 - 3s/epoch - 4ms/step
Epoch 29/100
697/697 - 2s - loss: 0.0070 - 2s/epoch - 3ms/step
Epoch 30/100
697/697 - 2s - loss: 0.0073 - 2s/epoch - 4ms/step
Epoch 31/100
697/697 - 2s - loss: 0.0068 - 2s/epoch - 3ms/step
Epoch 32/100
697/697 - 3s - loss: 0.0068 - 3s/epoch - 4ms/step
Epoch 33/100
697/697 - 3s - loss: 0.0071 - 3s/epoch - 5ms/step
Epoch 34/100
697/697 - 3s - loss: 0.0063 - 3s/epoch - 5ms/step
Epoch 35/100
697/697 - 3s - loss: 0.0063 - 3s/epoch - 4ms/step
Epoch 36/100
697/697 - 2s - loss: 0.0067 - 2s/epoch - 3ms/step
Epoch 37/100
697/697 - 3s - loss: 0.0059 - 3s/epoch - 5ms/step
Epoch 38/100
697/697 - 2s - loss: 0.0066 - 2s/epoch - 3ms/step
Epoch 39/100
697/697 - 2s - loss: 0.0063 - 2s/epoch - 3ms/step
Epoch 40/100
697/697 - 2s - loss: 0.0060 - 2s/epoch - 3ms/step
Epoch 41/100
697/697 - 2s - loss: 0.0060 - 2s/epoch - 3ms/step
Epoch 42/100
```

```
697/697 - 3s - loss: 0.0061 - 3s/epoch - 4ms/step
Epoch 43/100
697/697 - 2s - loss: 0.0061 - 2s/epoch - 3ms/step
Epoch 44/100
697/697 - 2s - loss: 0.0063 - 2s/epoch - 3ms/step
Epoch 45/100
697/697 - 2s - loss: 0.0061 - 2s/epoch - 3ms/step
Epoch 46/100
697/697 - 2s - loss: 0.0061 - 2s/epoch - 3ms/step
Epoch 47/100
697/697 - 3s - loss: 0.0058 - 3s/epoch - 4ms/step
Epoch 48/100
697/697 - 3s - loss: 0.0057 - 3s/epoch - 4ms/step
Epoch 49/100
697/697 - 2s - loss: 0.0062 - 2s/epoch - 3ms/step
Epoch 50/100
697/697 - 2s - loss: 0.0057 - 2s/epoch - 3ms/step
Epoch 51/100
697/697 - 2s - loss: 0.0058 - 2s/epoch - 3ms/step
Epoch 52/100
697/697 - 3s - loss: 0.0061 - 3s/epoch - 5ms/step
Epoch 53/100
697/697 - 3s - loss: 0.0056 - 3s/epoch - 4ms/step
Epoch 54/100
697/697 - 2s - loss: 0.0054 - 2s/epoch - 4ms/step
Epoch 55/100
697/697 - 2s - loss: 0.0062 - 2s/epoch - 3ms/step
Epoch 56/100
697/697 - 2s - loss: 0.0058 - 2s/epoch - 3ms/step
Epoch 57/100
697/697 - 3s - loss: 0.0057 - 3s/epoch - 4ms/step
Epoch 58/100
697/697 - 2s - loss: 0.0054 - 2s/epoch - 3ms/step
Epoch 59/100
697/697 - 2s - loss: 0.0057 - 2s/epoch - 3ms/step
Epoch 60/100
697/697 - 2s - loss: 0.0056 - 2s/epoch - 3ms/step
Epoch 61/100
697/697 - 2s - loss: 0.0059 - 2s/epoch - 3ms/step
Epoch 62/100
697/697 - 3s - loss: 0.0059 - 3s/epoch - 4ms/step
Epoch 63/100
697/697 - 3s - loss: 0.0056 - 3s/epoch - 4ms/step
Epoch 64/100
697/697 - 2s - loss: 0.0059 - 2s/epoch - 3ms/step
Epoch 65/100
697/697 - 2s - loss: 0.0055 - 2s/epoch - 3ms/step
Epoch 66/100
697/697 - 2s - loss: 0.0054 - 2s/epoch - 3ms/step
Epoch 67/100
697/697 - 2s - loss: 0.0061 - 2s/epoch - 3ms/step
Epoch 68/100
697/697 - 3s - loss: 0.0054 - 3s/epoch - 5ms/step
Epoch 69/100
697/697 - 2s - loss: 0.0057 - 2s/epoch - 3ms/step
Epoch 70/100
697/697 - 2s - loss: 0.0056 - 2s/epoch - 3ms/step
Epoch 71/100
697/697 - 2s - loss: 0.0058 - 2s/epoch - 3ms/step
Epoch 72/100
697/697 - 2s - loss: 0.0059 - 2s/epoch - 3ms/step
Epoch 73/100
697/697 - 3s - loss: 0.0057 - 3s/epoch - 4ms/step
Epoch 74/100
697/697 - 3s - loss: 0.0058 - 3s/epoch - 4ms/step
Epoch 75/100
697/697 - 2s - loss: 0.0055 - 2s/epoch - 3ms/step
Epoch 76/100
697/697 - 2s - loss: 0.0054 - 2s/epoch - 3ms/step
Epoch 77/100
697/697 - 2s - loss: 0.0055 - 2s/epoch - 3ms/step
Epoch 78/100
697/697 - 2s - loss: 0.0055 - 2s/epoch - 3ms/step
Epoch 79/100
697/697 - 3s - loss: 0.0059 - 3s/epoch - 4ms/step
Epoch 80/100
697/697 - 2s - loss: 0.0054 - 2s/epoch - 3ms/step
Epoch 81/100
697/697 - 2s - loss: 0.0055 - 2s/epoch - 3ms/step
Epoch 82/100
697/697 - 2s - loss: 0.0057 - 2s/epoch - 3ms/step
Epoch 83/100
697/697 - 2s - loss: 0.0057 - 2s/epoch - 3ms/step
Epoch 84/100
697/697 - 3s - loss: 0.0057 - 3s/epoch - 4ms/step
```

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Epoch 85/100
697/697 - 2s - loss: 0.0056 - 2s/epoch - 3ms/step
Epoch 86/100
697/697 - 2s - loss: 0.0056 - 2s/epoch - 3ms/step
Epoch 87/100
697/697 - 2s - loss: 0.0054 - 2s/epoch - 3ms/step
Epoch 88/100
697/697 - 2s - loss: 0.0056 - 2s/epoch - 3ms/step
Epoch 89/100
697/697 - 2s - loss: 0.0056 - 2s/epoch - 3ms/step
Epoch 90/100
697/697 - 3s - loss: 0.0058 - 3s/epoch - 4ms/step
Epoch 91/100
697/697 - 2s - loss: 0.0053 - 2s/epoch - 3ms/step
Epoch 92/100
697/697 - 2s - loss: 0.0056 - 2s/epoch - 3ms/step
Epoch 93/100
697/697 - 2s - loss: 0.0055 - 2s/epoch - 3ms/step
Epoch 94/100
697/697 - 2s - loss: 0.0057 - 2s/epoch - 3ms/step
Epoch 95/100
697/697 - 3s - loss: 0.0055 - 3s/epoch - 5ms/step
Epoch 96/100
697/697 - 2s - loss: 0.0054 - 2s/epoch - 3ms/step
Epoch 97/100
697/697 - 2s - loss: 0.0055 - 2s/epoch - 3ms/step
Epoch 98/100
697/697 - 2s - loss: 0.0056 - 2s/epoch - 3ms/step
```