In [3]:
```
import numpy as np
import pandas as pd
from sklearn.preprocessing import MinMaxScaler
from keras.models import Sequential
from keras.layers import LSTM, Dropout, Dense
from sklearn.metrics import mean_absolute_error

# Load and preprocess data
data = pd.read_csv('Dispense.csv')
scaler = MinMaxScaler(feature_range=(0, 1))
data_scaled = scaler.fit_transform(data['Dispense'].values.reshape(-1, 1))

# Prepare sequences
def create_sequences(data, seq_length):
    X = []
    y = []
    for i in range(len(data) - seq_length):
        X.append(data[i:i + seq_length])
        y.append(data[i + seq_length])
    return np.array(X), np.array(y)

seq_length = 30
X, y = create_sequences(data_scaled, seq_length)

# Split data
split = int(0.8 * len(X))
X_train, X_test = X[:split], X[split:]
y_train, y_test = y[:split], y[split:]

# Build LSTM model
model = Sequential()
model.add(LSTM(units=50, return_sequences=True, input_shape=(seq_length, 1)))
model.add(Dropout(0.2))
model.add(LSTM(units=50, return_sequences=False))
model.add(Dropout(0.2))
model.add(Dense(units=1))
model.compile(optimizer='adam', loss='mean_absolute_error')

# Train model
```

```
model.fit(X_train, y_train, epochs=50, batch_size=32, validation_split=0.1)

# Predict and evaluate
predictions = model.predict(X_test)
predictions = scaler.inverse_transform(predictions)
y_test_inv = scaler.inverse_transform(y_test)

mae = mean_absolute_error(y_test_inv, predictions)
print(f'Mean Absolute Error: {mae}')

# Forecast next 7 days
last_sequence = data_scaled[-seq_length:]
forecast = []
for _ in range(7):
    next_pred = model.predict(last_sequence.reshape(1, seq_length, 1))
    forecast.append(next_pred[0, 0])
    last_sequence = np.append(last_sequence[1:], next_pred)

forecast = scaler.inverse_transform(np.array(forecast).reshape(-1, 1))
print('Next 7 days forecast:', forecast.flatten())
```

```
D:\New folder\Lib\site-packages\keras\src\layers\rnn\rnn.py:204: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `Input(shape)` object as the first layer in the model instead.
  super().__init__(**kwargs)
```

```
Epoch 1/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 15s 20ms/step - loss: 0.1154 - val_loss: 0.1050
Epoch 2/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 16ms/step - loss: 0.1109 - val_loss: 0.1056
Epoch 3/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 10s 16ms/step - loss: 0.1100 - val_loss: 0.1049
Epoch 4/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 16ms/step - loss: 0.1089 - val_loss: 0.1031
Epoch 5/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 18ms/step - loss: 0.1088 - val_loss: 0.1033
Epoch 6/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 19ms/step - loss: 0.1091 - val_loss: 0.1032
Epoch 7/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 19ms/step - loss: 0.1071 - val_loss: 0.1033
Epoch 8/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 19ms/step - loss: 0.1071 - val_loss: 0.1027
Epoch 9/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 17ms/step - loss: 0.1090 - val_loss: 0.1031
Epoch 10/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 15ms/step - loss: 0.1066 - val_loss: 0.1025
Epoch 11/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 17ms/step - loss: 0.1085 - val_loss: 0.1026
Epoch 12/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 17ms/step - loss: 0.1056 - val_loss: 0.1036
Epoch 13/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 17ms/step - loss: 0.1055 - val_loss: 0.1041
Epoch 14/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 17ms/step - loss: 0.1056 - val_loss: 0.1046
Epoch 15/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 17ms/step - loss: 0.1049 - val_loss: 0.1029
Epoch 16/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 16ms/step - loss: 0.1048 - val_loss: 0.1074
Epoch 17/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 20ms/step - loss: 0.1051 - val_loss: 0.1043
Epoch 18/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 10s 18ms/step - loss: 0.1040 - val_loss: 0.1069
Epoch 19/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 16ms/step - loss: 0.1040 - val_loss: 0.1069
Epoch 20/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 16ms/step - loss: 0.1043 - val_loss: 0.1040
Epoch 21/50
```

```
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 16ms/step - loss: 0.1046 - val_loss: 0.1054
Epoch 22/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 16ms/step - loss: 0.1047 - val_loss: 0.1041
Epoch 23/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 18ms/step - loss: 0.1058 - val_loss: 0.1043
Epoch 24/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 17ms/step - loss: 0.1036 - val_loss: 0.1056
Epoch 25/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 17ms/step - loss: 0.1037 - val_loss: 0.1048
Epoch 26/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 17ms/step - loss: 0.1050 - val_loss: 0.1058
Epoch 27/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 17ms/step - loss: 0.1023 - val_loss: 0.1036
Epoch 28/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 11s 18ms/step - loss: 0.1038 - val_loss: 0.1036
Epoch 29/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 10s 16ms/step - loss: 0.1014 - val_loss: 0.1023
Epoch 30/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 16ms/step - loss: 0.1035 - val_loss: 0.1026
Epoch 31/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 15ms/step - loss: 0.1032 - val_loss: 0.1035
Epoch 32/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 17ms/step - loss: 0.1035 - val_loss: 0.1037
Epoch 33/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 18ms/step - loss: 0.1039 - val_loss: 0.1038
Epoch 34/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 18ms/step - loss: 0.1018 - val_loss: 0.1052
Epoch 35/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 15ms/step - loss: 0.1033 - val_loss: 0.1077
Epoch 36/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 17ms/step - loss: 0.1016 - val_loss: 0.1026
Epoch 37/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 16ms/step - loss: 0.1025 - val_loss: 0.1042
Epoch 38/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 15ms/step - loss: 0.1014 - val_loss: 0.1053
Epoch 39/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 16ms/step - loss: 0.1020 - val_loss: 0.1046
Epoch 40/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 17ms/step - loss: 0.1009 - val_loss: 0.1067
Epoch 41/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 17ms/step - loss: 0.1041 - val_loss: 0.1044
```

```
Epoch 42/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 16ms/step - loss: 0.1018 - val_loss: 0.1053
Epoch 43/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 16ms/step - loss: 0.1005 - val_loss: 0.1034
Epoch 44/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 17ms/step - loss: 0.1020 - val_loss: 0.1055
Epoch 45/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 17ms/step - loss: 0.1015 - val_loss: 0.1004
Epoch 46/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 20ms/step - loss: 0.1003 - val_loss: 0.1052
Epoch 47/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 17ms/step - loss: 0.1030 - val_loss: 0.1045
Epoch 48/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 6s 17ms/step - loss: 0.1022 - val_loss: 0.1040
Epoch 49/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 10s 17ms/step - loss: 0.0983 - val_loss: 0.1027
Epoch 50/50
328/328 ━━━━━━━━━━━━━━━━━━━━ 5s 16ms/step - loss: 0.0987 - val_loss: 0.1047
92/92 ━━━━━━━━━━━━━━━━━━━━ 2s 11ms/step
Mean Absolute Error: 230455.04662356785
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 31ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 29ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 28ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 26ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 29ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 28ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 27ms/step
Next 7 days forecast: [394895.16 228965.2  176321.48 236056.75 304060.1  299512.25 183971.39]
```

In [ ]:
```
#Code for ARIMA
```

In [2]:
```
import pandas as pd
from statsmodels.tsa.arima.model import ARIMA
from sklearn.metrics import mean_absolute_error

# Load data
data = pd.read_csv('Dispense.csv', parse_dates=['caldate'])
data.set_index('caldate', inplace=True)

# Train ARIMA model
```

```
train = data['Dispense'][:int(0.8 * len(data))]
test = data['Dispense'][int(0.8 * len(data)):]

arima_model = ARIMA(train, order=(5, 1, 0))
arima_model_fit = arima_model.fit()

# Predict and evaluate
predictions = arima_model_fit.forecast(steps=len(test))
mae = mean_absolute_error(test, predictions)
print(f'Mean Absolute Error: {mae}')

# Forecast next 7 days
forecast = arima_model_fit.forecast(steps=7)
print('Next 7 days forecast:', forecast.values)
```

```
D:\New folder\Lib\site-packages\statsmodels\tsa\base\tsa_model.py:473: ValueWarning: An unsupported index was provided and will
be ignored when e.g. forecasting.
  self._init_dates(dates, freq)
D:\New folder\Lib\site-packages\statsmodels\tsa\base\tsa_model.py:473: ValueWarning: An unsupported index was provided and will
be ignored when e.g. forecasting.
  self._init_dates(dates, freq)
D:\New folder\Lib\site-packages\statsmodels\tsa\base\tsa_model.py:473: ValueWarning: An unsupported index was provided and will
be ignored when e.g. forecasting.
  self._init_dates(dates, freq)
Mean Absolute Error: 226170.125146452
Next 7 days forecast: [435743.74359247 381136.10840052 420346.66724897 326334.07003046
 470775.18501113 341920.84405613 397809.55674381]
D:\New folder\Lib\site-packages\statsmodels\tsa\base\tsa_model.py:836: ValueWarning: No supported index is available. Predictio
n results will be given with an integer index beginning at `start`.
  return get_prediction_index(
D:\New folder\Lib\site-packages\statsmodels\tsa\base\tsa_model.py:836: FutureWarning: No supported index is available. In the n
ext version, calling this method in a model without a supported index will result in an exception.
  return get_prediction_index(
D:\New folder\Lib\site-packages\statsmodels\tsa\base\tsa_model.py:836: ValueWarning: No supported index is available. Predictio
n results will be given with an integer index beginning at `start`.
  return get_prediction_index(
D:\New folder\Lib\site-packages\statsmodels\tsa\base\tsa_model.py:836: FutureWarning: No supported index is available. In the n
ext version, calling this method in a model without a supported index will result in an exception.
  return get_prediction_index(
```

Tried to Implement a short code here .....

The Results are as follows :

LSTM: Mean Absolute Error: 230455.04662356785, Next 7 days forecast: [394895.16 228965.2 176321.48 236056.75 304060.1 299512.25 183971.39]

ARIMA: Mean Absolute Error: 226170.125146452 , Next 7 days forecast: [435743.74359247 381136.10840052 420346.66724897 326334.07003046 470775.18501113 341920.84405613 397809.55674381]