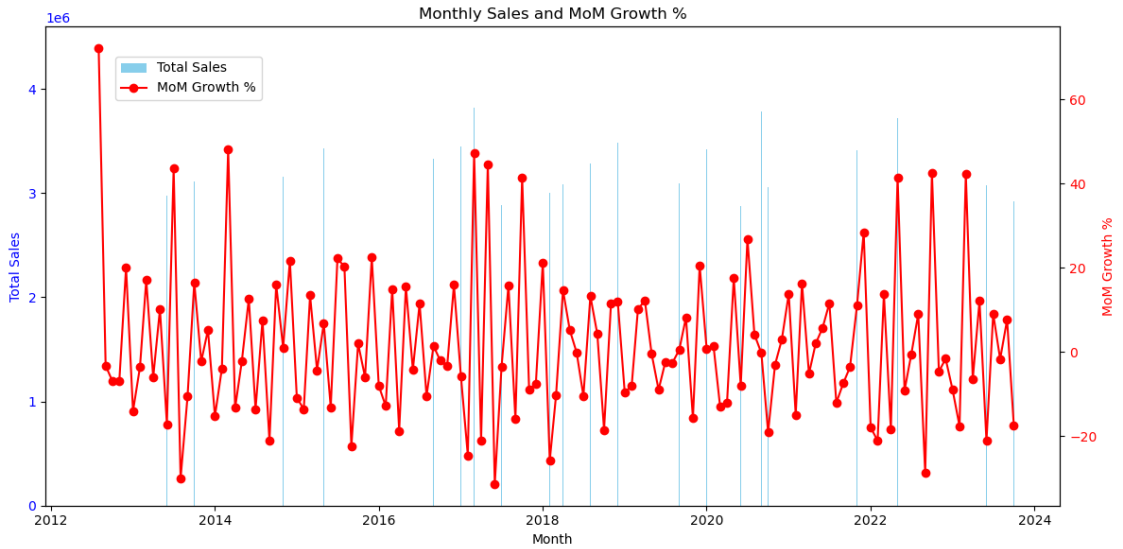
monthly_sales_mom_sql_python

August 11, 2025

[1]:
```
import sqlite3
import pandas as pd


db_path = 'northwind.db'


conn = sqlite3.connect(db_path)

sql = """
WITH MonthlySales AS (
    SELECT
        STRFTIME('%Y-%m', O.OrderDate) AS YearMonth,
        SUM(OD.UnitPrice * OD.Quantity * (1 - OD.Discount)) AS TotalSales
    FROM [Order Details] OD
    JOIN Orders O ON OD.OrderID = O.OrderID
    GROUP BY YearMonth
)
SELECT
    YearMonth,
    ROUND(TotalSales, 2) AS TotalSales,
    ROUND(
        (
            (TotalSales - LAG(TotalSales) OVER (ORDER BY YearMonth))
            / LAG(TotalSales) OVER (ORDER BY YearMonth)
        ) * 100, 2
    ) AS MoMGrowthPercent
FROM MonthlySales
ORDER BY YearMonth;
"""


df = pd.read_sql_query(sql, conn)
conn.close()


df
```

[1]:
```
    YearMonth  TotalSales  MoMGrowthPercent
0     2012-07  2066219.40               NaN
1     2012-08  3556875.79             72.14
2     2012-09  3440144.98             -3.28
3     2012-10  3201529.96             -6.94
4     2012-11  2980494.74             -6.90
..         …         …                …
131   2023-06  3071787.73            -21.17
132   2023-07  3350337.36              9.07
133   2023-08  3293158.67             -1.71
134   2023-09  3544698.51              7.64
135   2023-10  2923364.35            -17.53

[136 rows x 3 columns]
```

[3]:
```
fig, ax1 = plt.subplots(figsize=(12,6))

# Bars for total sales
ax1.bar(df_plot['YearMonth'], df_plot['TotalSales'], color='skyblue',␣
 ↪label='Total Sales')
ax1.set_xlabel('Month')
ax1.set_ylabel('Total Sales', color='blue')
ax1.tick_params(axis='y', labelcolor='blue')

# Secondary axis for MoM growth
ax2 = ax1.twinx()
ax2.plot(df_plot['YearMonth'], df_plot['MoMGrowthPercent'], color='red',␣
 ↪marker='o', label='MoM Growth %')
ax2.set_ylabel('MoM Growth %', color='red')
ax2.tick_params(axis='y', labelcolor='red')

# Legends
fig.legend(loc="upper left", bbox_to_anchor=(0.1,0.9))
plt.title("Monthly Sales and MoM Growth %")
fig.tight_layout()
plt.show()
```


Monthly Sales and MoM Growth %
1e6
Total Sales
MoM Growth %
Total Sales
MoM Growth %
Month
0
1
2
3
4
−20
0
20
40
60
2012
2014
2016
2018
2020
2022
2024