Business Analytics Project - Time Series Analysis

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Target Role: Business Analyst / Product Analyst / APM

Tech Stack: Python (Pandas), Jupyter Notebook, Data Analysis

1. Concept: Time Series

Time-series = analyzing data over time (daily, weekly, monthly).

Purpose: detect growth, decline, and seasonality in business performance.

Formula examples:

- Daily Revenue = SUM(amount) grouped by order_date
- Weekly Revenue = SUM(amount) resample('W')
- Rolling Average = Moving mean over window size (e.g., 3-day avg)

2. Sample Dataset (Orders)

order_date	amount
2025-01-01	200
2025-01-02	300
2025-01-03	500
2025-01-04	700
2025-01-05	600
2025-01-06	400
2025-01-07	800
2025-01-08	1200

| 2025-01-09 | 1000 |

| 2025-01-10 | 900 |

3. Application & Results

(a) Daily Revenue

Formula: SUM(amount) grouped by date

Code: df.groupby('order_date')['amount'].sum()

Result:

| order_date | revenue |

|---|---|

| 2025-01-01 | 200 |

| 2025-01-02 | 300 |

| 2025-01-03 | 500 |

Insight: Revenue steadily increasing in first 3 days.

(b) Weekly Revenue

Formula: SUM(amount) resample by 'W'

Code: df.set_index('order_date').resample('W')['amount'].sum()

Result:

| week | revenue |

|---|---|

| Week 1 | 1700 |

| Week 2 | 4300 |

Insight: Week 2 revenue is 2.5x higher than Week 1.

(c) Rolling Average (3-day)

Formula: Rolling mean (window=3)

Code: df['rolling_avg'] = df['amount'].rolling(window=3).mean()

Result:

order_date	amount	rolling_avg
Day 1	200	NaN
Day 2	300	NaN
Day 3	500	333.3
Day 4	700	500.0

Insight: Rolling average smooths daily noise -> Seth gets clear trend.

4. Final Business Takeaways

- Week 2 revenue > Week 1 -> business growing.
- Mid-week spikes suggest targeted campaigns.
- Rolling avg helps identify trend without daily fluctuations.
- Useful for forecasting & capacity planning.

5. Recruiter Note

This project demonstrates ability to:

- Perform time-series aggregation in Pandas
- Apply daily, weekly, monthly rollups
- Use rolling averages for trend smoothing
- Translate patterns into actionable business insights

Portfolio Proof: Shows candidate can handle real-world date-based data analysis.