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Homework Assignment for Data Analyst

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About me

Rafael Fagundes

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Data Analyst
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With 10+ years in data and marketing, I specialize in data-driven insights and scalable solutions using SQL, Python, and BI tools. I'm eager to help Autodoc improve dashboards, reporting, and decision-making.

2005
- *Senior Software Developer*

2010
- *Senior Software Developer*

2011
- *2011 - Data Analyst*
- *2012 - Go-to-Market and CRM Specialist*
- *2014 - B2B Lead Generation Specialist*
- *2016 - B2B Email Marketing Specialist*

2018
- *2018 - B2B Digital Marketing Strategist*
- *2022 - Global Innovation Strategist*
- *2023 - Global AdTech Strategist*

2024
- *Data & CRM Expert*

Tools and Repository

- Python – Used for Task 1: EDA, aggregation, anomaly detection, funnel visualization, and KPIs. Also used in Task 2 for validation purposes.
- SQL (SQLite) – Primary tool for Task 2: Funnel metrics and validation.
- Power BI – Consolidated results into an interactive dashboard.

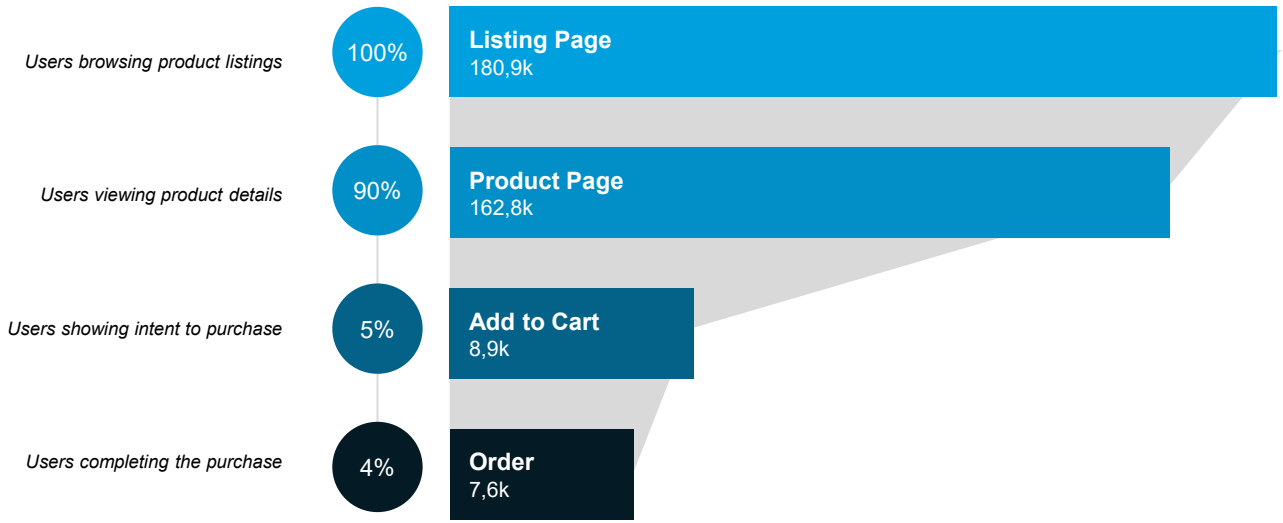
Repository and Files:

- Python Notebook: https://github.com/rs-fagundes/take-home-assessments/blob/main/Autodoc/autodoc_assessment.ipynb
- SQL Script: https://github.com/rs-fagundes/take-home-assessments/blob/main/Autodoc/autodoc_assessment.sql
- Power BI Dashboard: https://drive.google.com/file/d/1Lq0gciaP9lXPBs7mgJ33YOz0IM6kz4nS/view?usp=drive_link

Part 1
Main

How Users Progress Through the Purchase Funnel

Based on user navigation data, this funnel outlines the key steps in the purchase journey.



Key Insights

Most users start on listing pages; search plays a secondary role.

Large drop-off after product pages suggests UX, trust, or pricing barriers.

Conversion from add-to-cart to order is steady but low.

Recommendations

Optimize CTAs, reviews, and pricing transparency.

Improve post-product page experience to drive cart actions.

Streamline checkout and enhance value proposition.

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Key Metrics to Monitor and Improve User Engagement

These KPIs provide a clear view of user engagement, intent, and conversion barriers.

They help track performance over time, highlight areas where marketing or UX improvements can drive impact, and serve as key metrics for ongoing performance monitoring.

CATEGORY	KEY METRICS / DATA	PURPOSE / INSIGHT
Page View Distribution per Page Type	% of sessions visiting each main page type (Product, Listing, Search)	Understand where user attention is focused
Add-to-Cart Rate per Page Type	% of sessions adding products to cart after viewing product or listing pages	Reflects user engagement and intent to purchase
Order Conversion Rate	% of sessions that complete a purchase	Core metric to evaluate funnel effectiveness
Drop-off Rate Between Steps	% of users abandoning after each stage (view to add-to-cart, add-to-cart to order)	Identifies weak points in the user journey
Most Common Navigation Paths	Top 5-10 most frequent user journeys through the site	Provides clarity on typical user behavior patterns

Missing Data That Limits Strategy Evaluation

Without data on revenue, source, and segmentation, it’s not possible to measure the strategy’s effectiveness beyond user behavior.

To optimize or validate decisions, it’s essential to connect behavior with business outcomes.

CATEGORY	KEY METRICS / DATA	PURPOSE / INSIGHT
Revenue / Profit Metrics	Revenue per session, AOV, Margin	Connect behavior to business impact
Acquisition Source	Paid, Organic, Direct, Referral	Identify high-conversion channels
Segmentation Data	New vs. Returning; Demographics; Behavior	Clarify audience differences
Cart Abandonment	% Abandoned carts; Reasons (if available)	Identify friction points
Performance Over Time	Weekly / Monthly trends	Assess strategy impact over time
Product Performance	Conversion by category, brand, SKU	Optimize by product type

Impact of Entry Pages on Engagement and Conversion

This analysis maps how entry pages influence user behavior and funnel performance.

Product and search pages drive higher engagement and conversions than listings, a key input to optimize UX and acquisition.

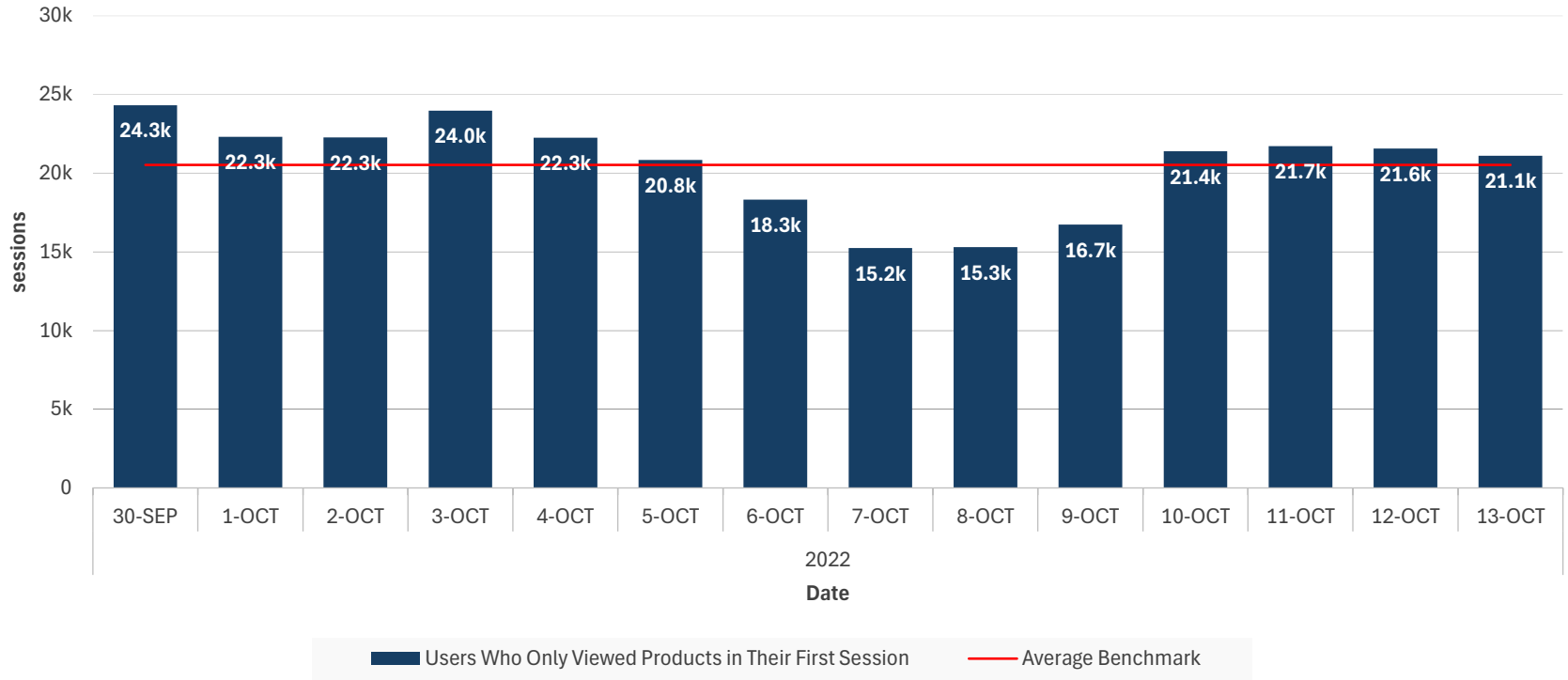
FIRST PAGE TYPE	PAGE VIEWED	ADDED TO CART	ORDERED	PAGE VIEW DISTRIBUTION %	ADD TO CART RATE %	ORDER CONVERSION RATE %	DROP OFF RATE %
listing_page	176.8k	3.1k	2.4k	52.1%	1.7%	1.3%	98.7%
product_page	146.9k	6.6k	3.3k	43.3%	4.5%	2.3%	97.7%
search_listing_page	15.3k	1.0k	539	4.5%	6.8%	3.5%	96.5%

**Order pages were excluded as entry points because they do not represent a natural starting point in the user journey. The analysis focuses on pages where users actively begin exploring products.*

Part 2
SQL

High Volume of Users Only Viewing Products in Their First Session

- 15k-24k daily users view products without taking action
- Low engagement signals potential UX or incentive gaps
- Recommend optimizing CTAs and testing re-engagement strategies



*Average benchmark calculated over the full period.

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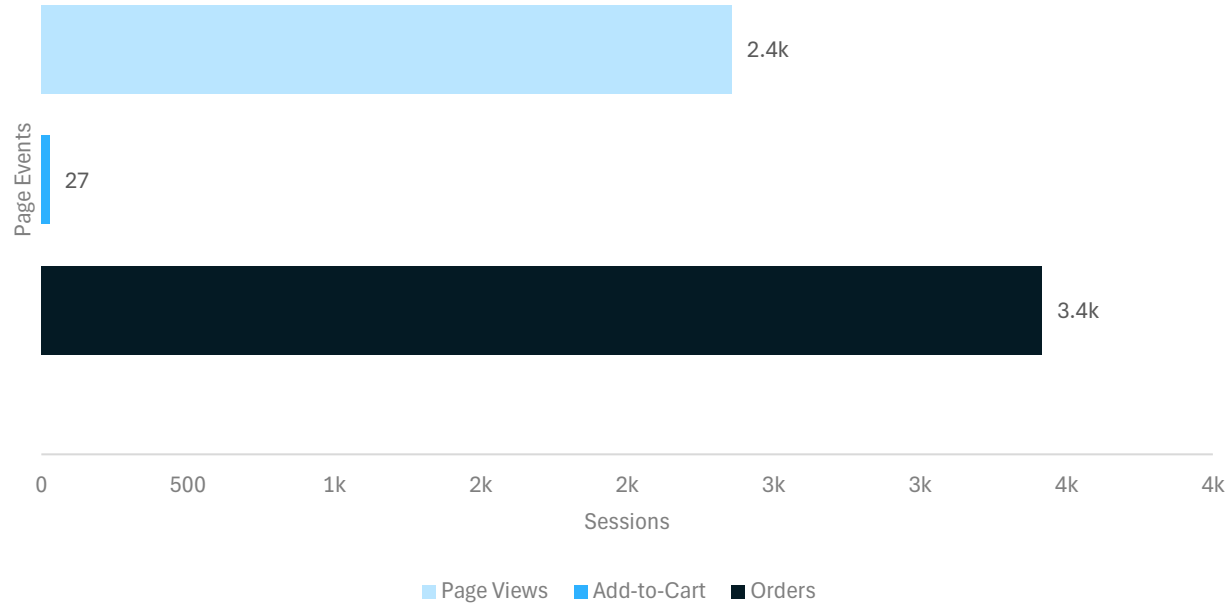
Unusual Orders Without Page Views or Cart Activity

- 3.4k sessions placed orders without any page views or cart activity
- May indicate a tracking gap or a direct checkout flow bypassing standard pages
- Further investigation is recommended to confirm root cause



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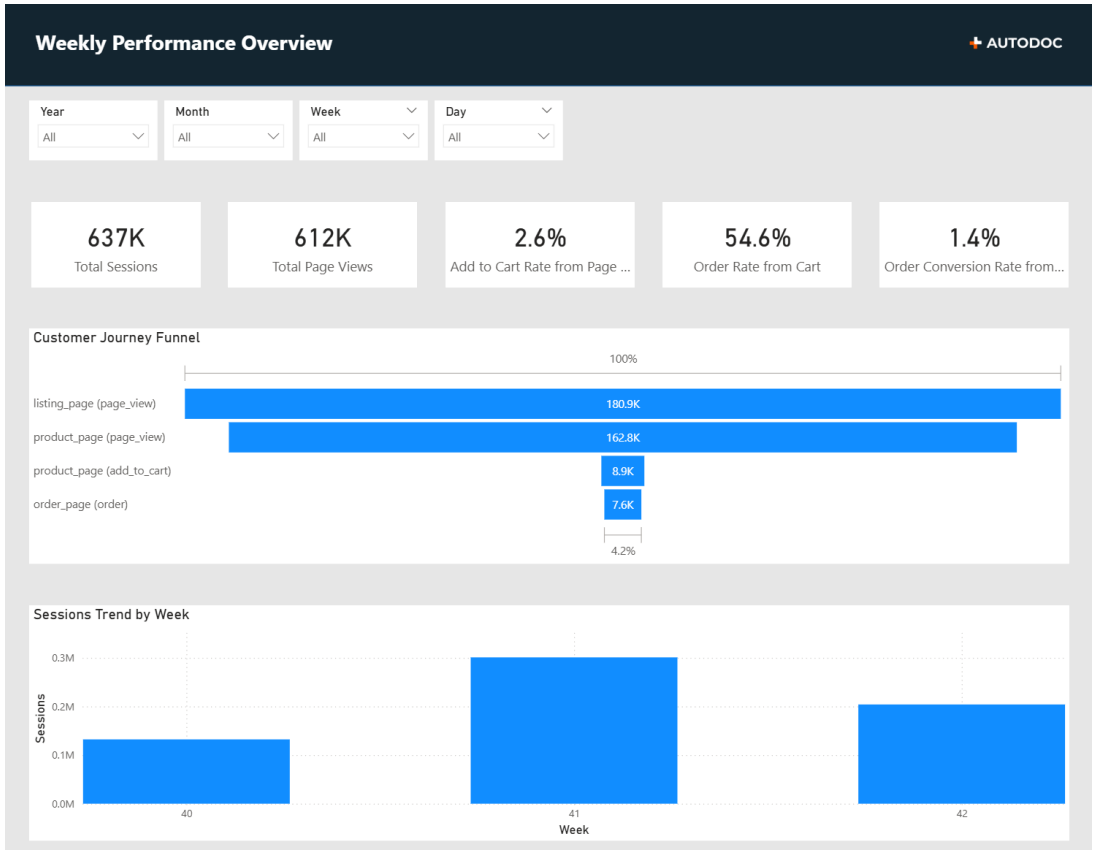
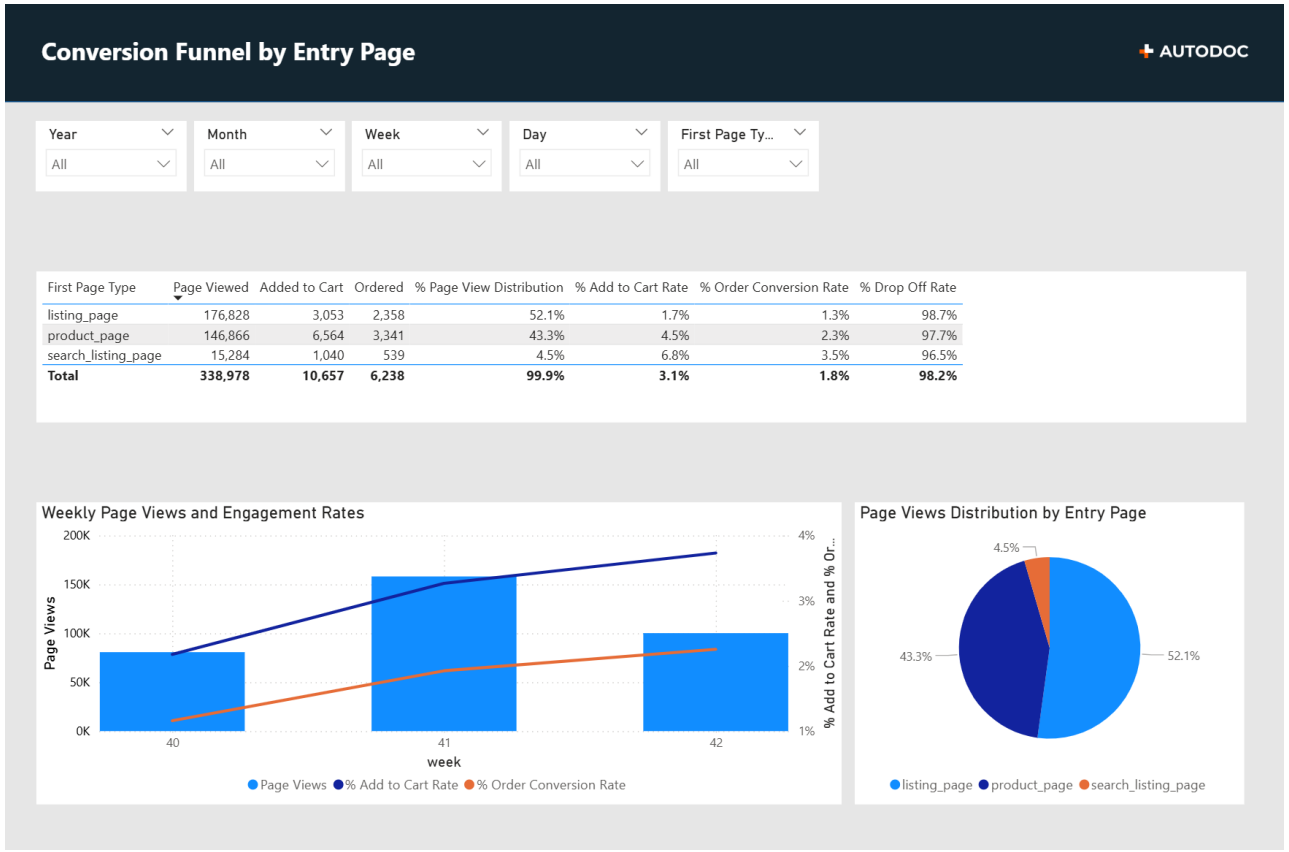
Appendix

Power BI Dashboard

[Link to Power BI Dashboard]





First Page Type	Page Viewed	Added to Cart	Ordered	% Page View Distribution	% Add to Cart Rate	% Order Conversion Rate	% Drop Off Rate
listing_page	176,828	3,053	2,358	52.1%	1.7%	1.3%	98.7%
product_page	146,866	6,564	3,341	43.3%	4.5%	2.3%	97.7%
search_listing_page	15,284	1,040	539	4.5%	6.8%	3.5%	96.5%
Total	**338,978**	**10,657**	**6,238**	**99.9%**	**3.1%**	**1.8%**	**98.2%**

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SQL Script

Link to SQL Script

Exercise 1

```sql
WITH
    first_session AS (
        SELECT
            user,
            MIN(session) AS first_session
        FROM
            data_set_da_test d
        GROUP BY
            user
    ),
    first_session_events AS (
        SELECT
            e.user,
            e.event_date,
            e.event_type
        FROM
            data_set_da_test e
            JOIN first_session f ON e.user = f.user
            AND e.session = f.first_session
    ),
    clients_only_viewed AS (
        SELECT
            user,
            event_date
        FROM
            first_session_events
        GROUP BY
            user,
            event_date
        HAVING
            SUM(
                CASE
                    WHEN event_type != 'page_view' THEN 1
                    ELSE 0
                END
            ) = 0
    )
SELECT
    DATE (event_date),
    COUNT(DISTINCT user) AS clients_only_viewed
FROM
    clients_only_viewed
GROUP BY
    DATE (event_date);
```

Exercise 2

```sql
WITH
    user_events AS (
        SELECT
            session,
            SUM(
                CASE
                    WHEN event_type = 'page_view' THEN 1
                    ELSE 0
                END
            ) AS views,
            SUM(
                CASE
                    WHEN event_type = 'add_to_cart' THEN 1
                    ELSE 0
                END
            ) AS carts,
            SUM(
                CASE
                    WHEN event_type = 'order' THEN 1
                    ELSE 0
                END
            ) AS orders
        FROM
            data_set_da_test d
        GROUP BY
            session
    ),
    orders_without_views_or_carts AS (
        SELECT
            session,
            views,
            carts,
            orders
        FROM
            user_events
        WHERE
            orders > 0
            AND (
                views = 0
                OR carts = 0
            )
    )
SELECT
    COUNT(
        CASE
            WHEN views > 0 THEN 1
        END
    ) as views,
    COUNT(
        CASE
            WHEN carts > 0 THEN 1
        END
    ) as carts,
    COUNT(
        CASE
            WHEN orders > 0 THEN 1
        END
    ) as orders
FROM
    orders_without_views_or_carts;
```


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