



Website Performance Analysis with Python

Hands-on project analyzing real website data using Python

LEARNING OBJECTIVES



Data Cleaning

Clean and preprocess website user data



Exploratory Analysis

Perform comprehensive EDA



Traffic Insights

Uncover patterns, bounce rates & engagement



Visualizations

Create stunning charts with Pandas, Matplotlib & Seaborn

Tools & Technologies



Python

Core programming language



Pandas & NumPy

Data manipulation



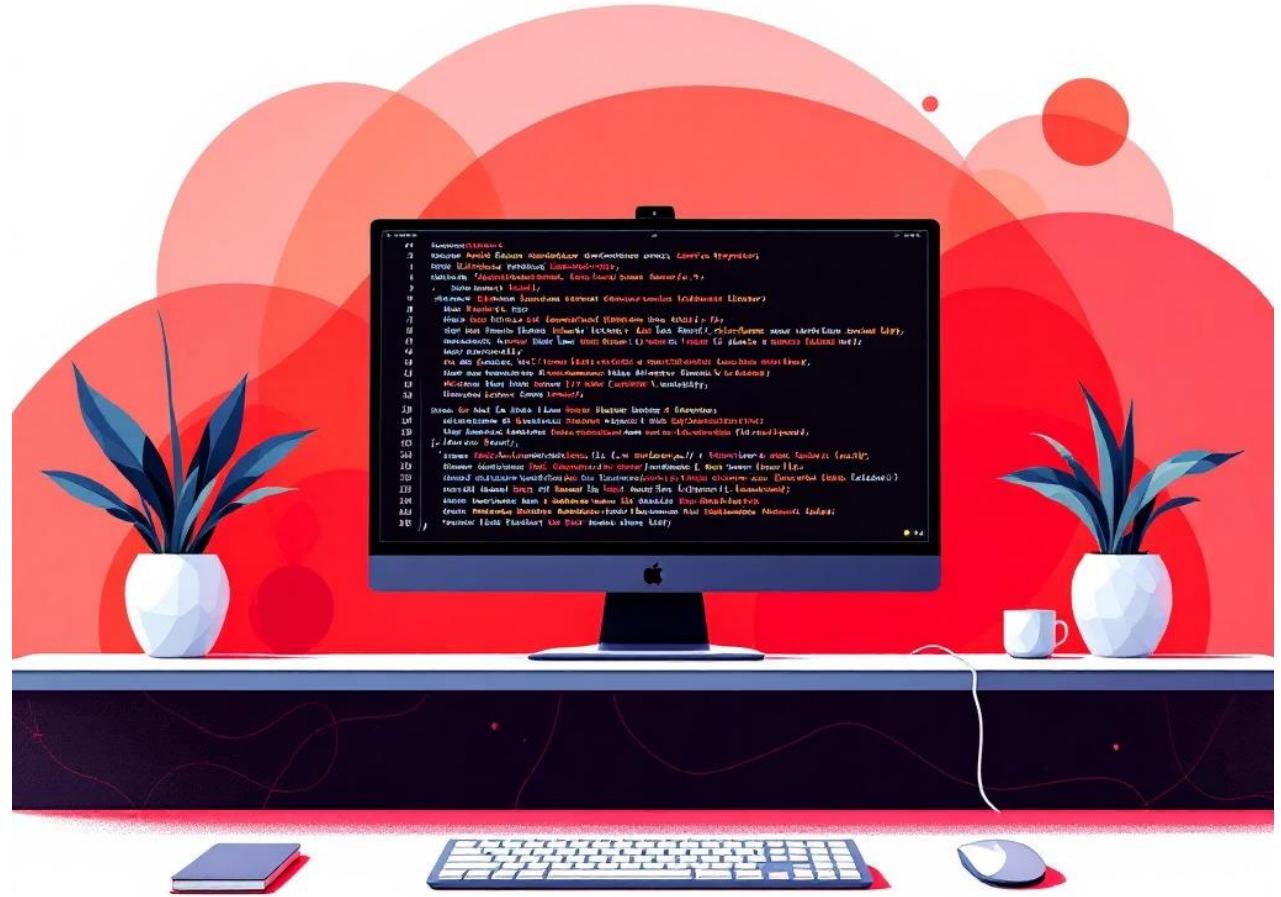
Matplotlib & Seaborn

Data visualization



Jupyter Notebook

Interactive development



2.1

ANALYSIS QUESTIONS

Key Questions to Answer

01

Traffic Patterns

What trends exist in sessions and users over time?

02

Channel Performance

Which marketing channel drives highest traffic?

03

Engagement Analysis

Which channel has highest average engagement time?

04

Engagement Variation

How does engagement rate vary across channels?

05

Session Quality

Which channels drive more engaged sessions?

06

Hourly Patterns

At what hours does each channel drive most traffic?

07

Correlation

Is there correlation between high traffic and engagement?



</> DATA PREPARATION

Cleaning & Validation



Load Data

Import CSV with Pandas



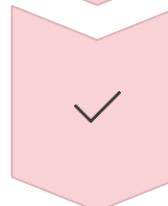
Fix Columns

Rename and restructure



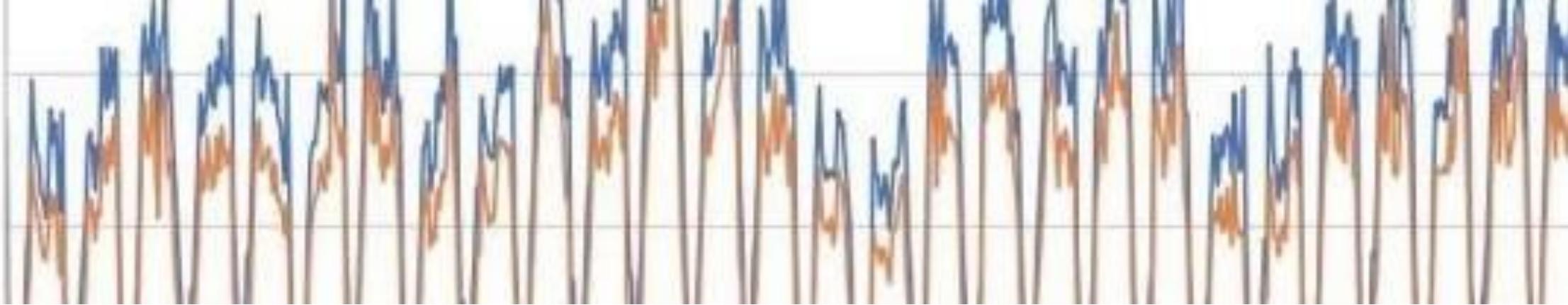
Convert Types

DateTime & numeric conversion



Validate

3,182 entries ready



Sessions & Users Over Time

Both metrics show high volatility with peaks and troughs throughout April 2024

3182

Total Records

Hourly data points analyzed

500

Peak Sessions

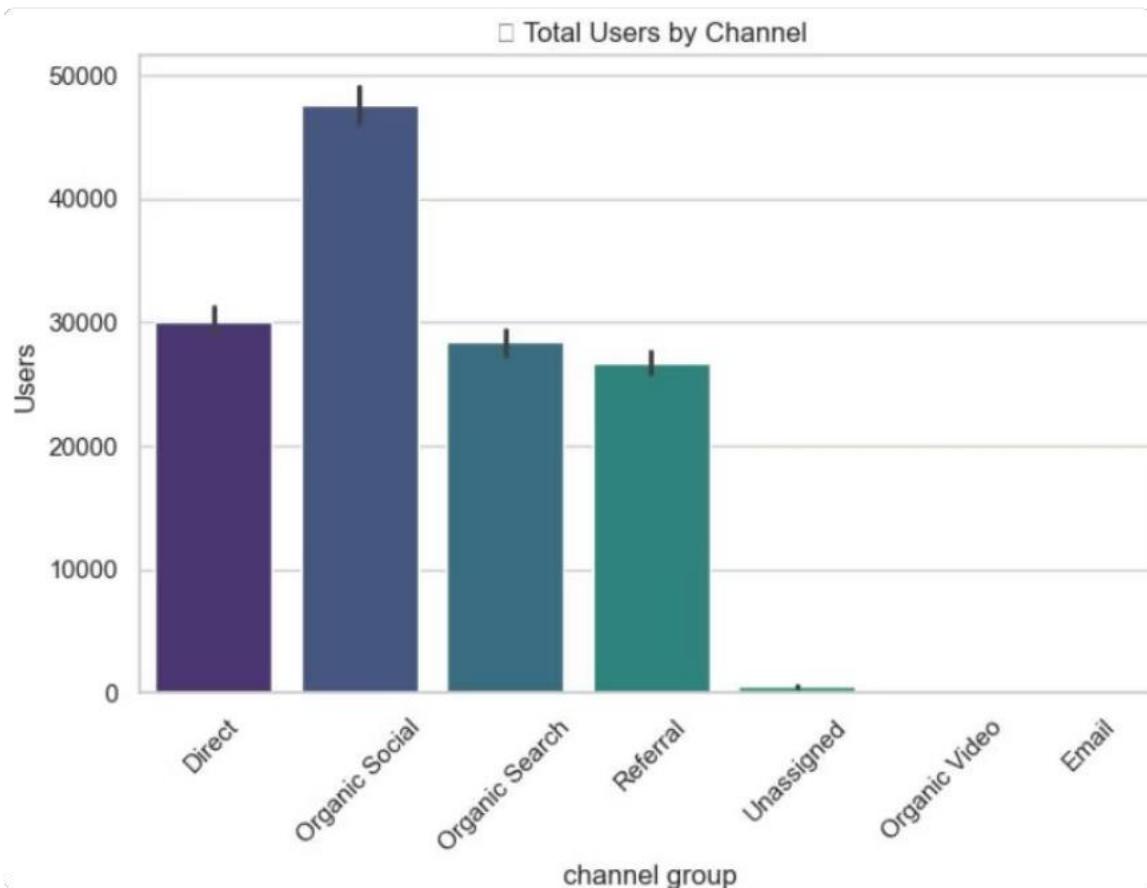
Maximum hourly sessions

28

Days Tracked

April 6 - May 3, 2024

Total Users by Channel



Organic Social Dominates

48,000 users - highest traffic source

Direct: 30K

Second largest channel

Organic Search: 28K

Strong SEO performance

Referral: 27K

Partnership traffic

Average Engagement Time by Channel

Organic Video: 180s

Highest engagement - users spend 3x more time

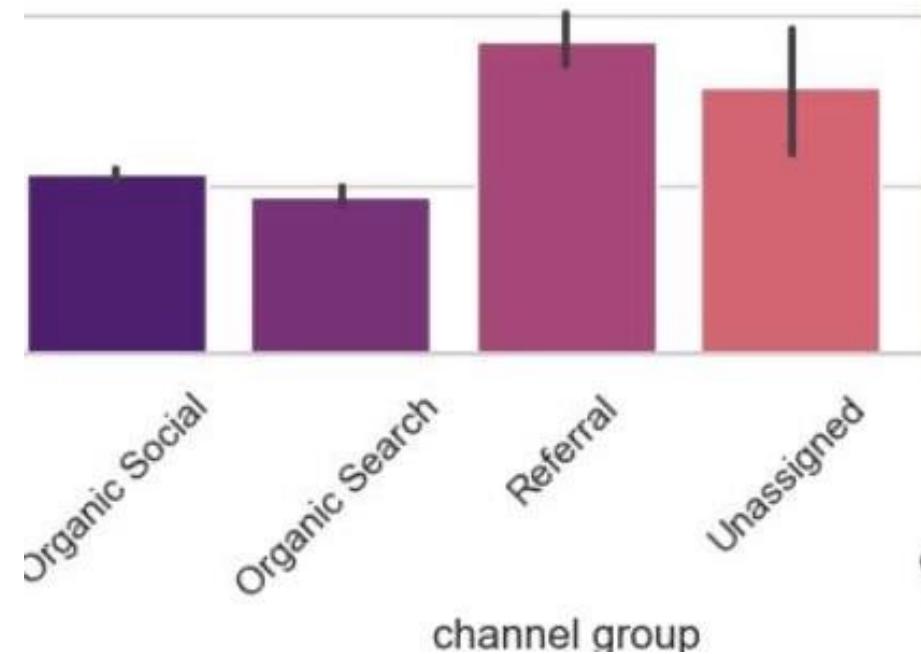
Referral: 92s

Quality traffic from partnerships

Email: 75s

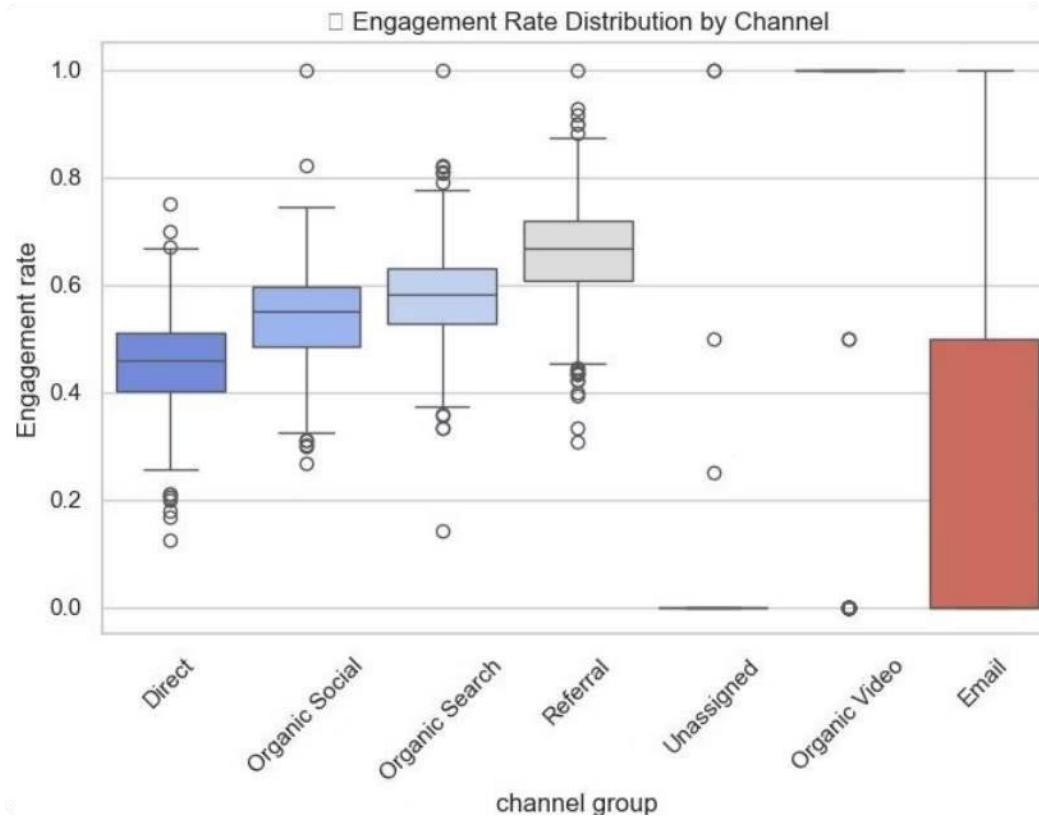
Targeted audience engagement

Video content drives significantly longer engagement times

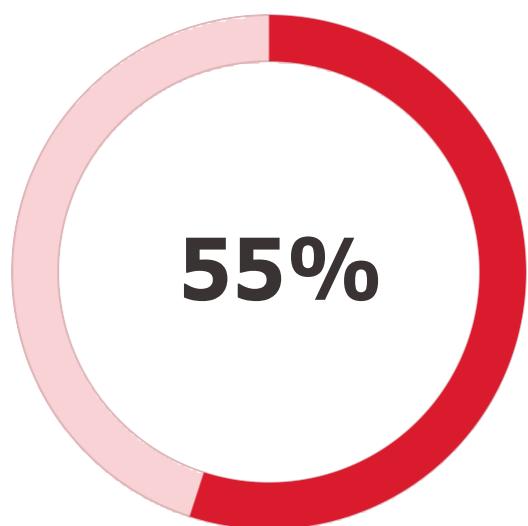
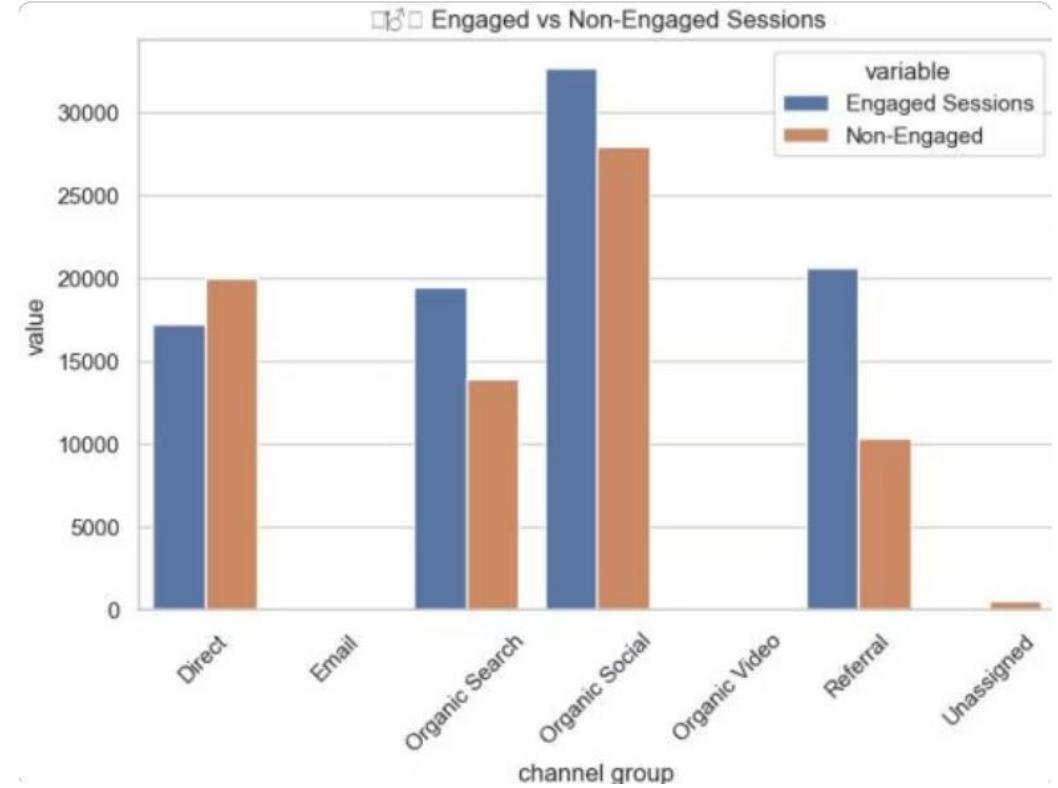


Engagement Rate & Session Quality

Distribution by Channel

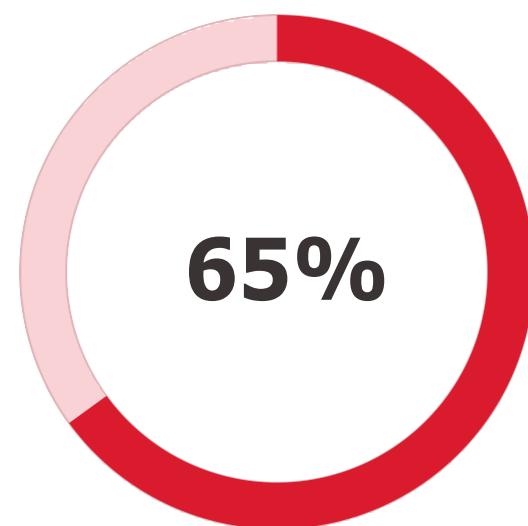


Engaged vs Non-Engaged



Average Engagement Rate

Across all channels



Referral Engagement

Highest median rate

Traffic Patterns & Correlations

1 Peak Hours

Evening hours (19-23) show highest traffic across channels

2 Channel Timing

Organic Social peaks at 3,500 sessions during prime hours

3 Engagement Correlation

High traffic doesn't always mean high engagement rate

- Key Insight:** Optimize content strategy for evening hours when user engagement peaks. Focus on Organic Video and Referral channels for quality engagement.

□ Traffic by Hour and Channel

Hour	Channel	Sessions	Engagement Rate
13:00	Organic Search	1311	6
14:00	Organic Social	984	5
15:00	Organic Video	804	7
16:00	Referrals	606	5
17:00	Organic Search	535	4
18:00	Organic Social	506	4
19:00	Organic Video	639	5
20:00	Referrals	778	7
21:00	Organic Search	938	8
22:00	Organic Social	1269	11
23:00	Organic Video	1649	10
00:00	Referrals	1839	11
01:00	Organic Search	1871	11
02:00	Organic Social	1758	10
03:00	Organic Video	1984	11
04:00	Referrals	1898	10
05:00	Organic Search	1709	11
06:00	Organic Social	1598	11
07:00	Organic Video	1844	10
08:00	Referrals	1887	11
09:00	Organic Search	1924	11
10:00	Organic Social	1838	11
11:00	Organic Video	1814	11
12:00	Referrals	1409	11

Organic Search Organic Social Organic Video Referrals
Channel Group