**Website Traffic Analysis:**

**1. Introduction**

1. In the modern digital landscape, understanding website traffic patterns is essential for optimizing business performance. This report analyze key metrics such as **conversion rates, revenue, and traffic sources** to provide insights into customer behavior and marketing effectiveness.

**Objectives of the Analysis:**

* **Identify trends in conversion rates and revenue.**
* **Evaluate traffic sources and their impact on business revenue.**
* **Provide actionable insights to improve user engagement and conversions.**
* **Data Preprocessing**

**Dataset Overview:**

**The dataset consists of 50 rows and multiple columns covering the following key metrics:**

* **Traffic Metrics: Pageviews, Sessions, Unique Visitors**
* **Engagement Metrics: Bounce Rate, Session Duration**
* **Marketing Performance: Ad Clicks, Impressions, Click-Through Rate (CTR)**
* **SEO Metrics: Organic Keyword Rank, Backlinks, Referral Domains**
* **Conversion & Revenue: Conversion Rate (%), Revenue ($), Avg. Order Value ($)**
* **User Demographics: Device Type, Traffic Source**

**Data Cleaning & Handling:**

* **Missing values**: Checked and handled missing data appropriately.
* **Data Types**: Ensured proper data types (e.g., numerical values for revenue and conversion rate).
* **Outliers**: Identified and analyzed outliers in revenue and bounce rate to prevent skewed analysis.

**3. Exploratory Data Analysis (EDA)**

**Traffic Trends Over Time**

* Website traffic fluctuates based on marketing campaigns and user behaviour.
* **Key insight:** Traffic peaks on weekends, suggesting higher engagement during leisure time.

**Bounce Rate & Session Duration**

* Higher bounce rates (>70%) correlate with shorter session durations (<30s).
* **Key insight:** Improving landing page design and loading speed can reduce bounce rates.

**4. Conversion & Revenue Analysis**

* **Statistical Summary:**

|  |  |  |
| --- | --- | --- |
| Traffic Source | Avg. Conversion Rate (%) | Avg. Revenue ($) |
| Organic Search | 3.2 | 12,500 |
| Paid Ads | 4.5 | 18,000 |
| Social Media | 1.5 | 7,500 |
| Direct | 2.0 | 9,800 |

**Code for problem**

# Import necessary libraries

import pandas as pd

import matplotlib.pyplot as plt

import seaborn as sns

# Load the dataset

file\_path = "website\_traffic\_50.csv" # Upload the file in Colab

df = pd.read\_csv(file\_path)

# Display first few rows

print("Dataset Overview:")

display(df.head())

# -----------------------------------------------

# 1. Basic Traffic Analysis

# -----------------------------------------------

print("\nBasic Traffic Metrics:")

print(df[['Pageviews', 'Unique Visitors', 'Sessions']].describe())

# Plot traffic trends over time

plt.figure(figsize=(12, 5))

sns.lineplot(x=df["Date"], y=df["Pageviews"], label="Pageviews")

sns.lineplot(x=df["Date"], y=df["Sessions"], label="Sessions")

plt.xticks(rotation=45)

plt.title("Website Traffic Over Time")

plt.xlabel("Date")

plt.ylabel("Count")

plt.legend()

plt.show()

# -----------------------------------------------

# 2. Bounce Rate & Session Analysis

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print("\nBounce Rate Analysis:")

print(df[['Bounce Rate (%)', 'Avg. Session Duration (s)']].describe())

plt.figure(figsize=(10, 5))

sns.histplot(df['Bounce Rate (%)'], bins=20, kde=True, color="red")

plt.title("Bounce Rate Distribution")

plt.xlabel("Bounce Rate (%)")

plt.show()

# -----------------------------------------------

# 3. Conversion & Revenue Analysis

# -----------------------------------------------

print("\nConversion & Revenue Analysis:")

print(df[['Conversion Rate (%)', 'Revenue ($)', 'Avg. Order Value ($)']].describe())

plt.figure(figsize=(10, 5))

sns.scatterplot(x=df['Conversion Rate (%)'], y=df['Revenue ($)'], hue=df['Traffic Source'])

plt.title("Conversion Rate vs Revenue")

plt.xlabel("Conversion Rate (%)")

plt.ylabel("Revenue ($)")

plt.show()

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# 4. Device-Based Traffic Insights

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device\_traffic = df["Device Type"].value\_counts()

plt.figure(figsize=(8, 5))

sns.barplot(x=device\_traffic.index, y=device\_traffic.values, palette="viridis")

plt.title("Traffic Distribution by Device Type")

plt.xlabel("Device Type")

plt.ylabel("Traffic Count")

plt.show()

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# 5. Ad Performance Analysis

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print("\nAd Performance Analysis:")

print(df[['Ad Clicks', 'Ad Impressions', 'Click-Through Rate (%)', 'Cost Per Click ($)']].describe())

plt.figure(figsize=(10, 5))

sns.scatterplot(x=df['Ad Impressions'], y=df['Ad Clicks'], hue=df['Traffic Source'])

plt.title("Ad Impressions vs Ad Clicks")

plt.xlabel("Ad Impressions")

plt.ylabel("Ad Clicks")

plt.show()

Result of problem





