Project Definition and Design Thinking: Website Traffic Analysis

Problem Definition:

In the digital age, websites serve as essential platforms for information dissemination, e-commerce, and user engagement. Understanding how users interact with a website is crucial for optimizing its performance, enhancing the user experience, and achieving business objectives. This project involves defining objectives, designing the analysis approach and selecting visualization techniques using IBM Cognos.

The dataset employed for this project is ". xlsx" file from the Link : **https://www.kaggle.com/datasets/bobnau/daily-website-visitors**

	A	B	C	D	E	F	G	H	I
1	Row	Day	Day.Of.W	Date	Page.Load	Unique.Vi	First.Time	Returning.	Visits
2	1	Sunday	1	9/14/2014	2,146	1,582	1,430	152	
3	2	Monday	2	9/15/2014	3,621	2,528	2,297	231	
4	3	Tuesday	3	9/16/2014	3,698	2,630	2,352	278	
5	4	Wednesd	4	9/17/2014	3,667	2,614	2,327	287	
6	5	Thursday	5	9/18/2014	3,316	2,366	2,130	236	
7	6	Friday	6	9/19/2014	2,815	1,863	1,622	241	
8	7	Saturday	7	9/20/2014	1,658	1,118	985	133	
9	8	Sunday	1	9/21/2014	2,288	1,656	1,481	175	
10	9	Monday	2	9/22/2014	3,638	2,586	2,312	274	
11	10	Tuesday	3	9/23/2014	4,462	3,257	2,989	268	
12	11	Wednesd	4	9/24/2014	4,414	3,175	2,891	284	
13	12	Thursday	5	9/25/2014	4,315	3,029	2,743	286	
14	13	Friday	6	9/26/2014	3,323	2,249	2,033	216	
15	14	Saturday	7	9/27/2014	1,656	1,180	1,040	140	
16	15	Sunday	1	9/28/2014	2,465	1,806	1,613	193	
17	16	Monday	2	9/29/2014	4,096	2,873	2,577	296	
18	17	Tuesday	3	9/30/2014	4,474	3,032	2,720	312	
19	18	Wednesd	4	########	4,124	2,849	2,541	308	
20	19	Thursday	5	########	3,514	2,489	2,239	250	
21	20	Friday	6	########	3,005	2,097	1,856	241	
22	21	Saturday	7	########	2,054	1,436	1,274	162	
23	22	Sunday	1	########	2,847	1,913	1,713	200	
24	23	Monday	2	########	4,501	3,181	2,853	328	
25	24	Tuesday	3	########	4,603	3,163	2,804	359	

1. **Project Objectives**

Objective 1: Understand User Behavior

- Analyze historical website traffic data to gain insights into user behavior, such as page views, visit durations, bounce rates, and navigation patterns.
- Identify trends and patterns in user interactions with the website.

Objective 2: Analyze Traffic Sources

- Determine the primary sources of website traffic, including organic search, social media, referrals, and direct visits.
- Understand the effectiveness of each traffic source in driving visitors to the website.

Objective 3: Optimize Content and User Experience

- Identify popular and underperforming webpages based on traffic data to inform content optimization strategies.
- Evaluate the effectiveness of the website's user experience and identify areas for improvement.

Objective 4: Monitor Key Performance Indicators (KPIs)

- Establish and track key performance indicators (KPIs) such as conversion rates, click-through rates (CTR), and user engagement metrics.
- Set benchmarks for KPIs and monitor progress over time.

2. **Analysis Approach**

Step 1: Data Collection and Integration

- Retrieve historical website traffic data from analytics tools (e.g., Google Analytics, Adobe Analytics) and any other relevant data sources.
- Ensure data quality and accuracy through data cleaning and validation processes.
- Import the cleaned data into the analysis platform.

Step 2: Data Preprocessing

- Handle missing data, outliers, and data inconsistencies.
- Aggregate data by relevant time intervals (e.g., daily, monthly) to facilitate trend analysis.
- Prepare data for segmentation by user demographics and traffic source.

Step 3: Data Analysis

- Utilize statistical and data analysis techniques to identify trends, patterns, and correlations in website traffic data.

- Conduct cohort analysis to understand user behavior over time.
- Perform A/B testing to evaluate the impact of changes on website performance.

Step 4: Identifying Popular and Underperforming Pages

- Analyze page-level traffic data to identify the most visited pages, high-impact content, and areas with low engagement.
- Identify pages with high bounce rates or exit rates that may require improvement.

Step 5: Reporting and Visualization

- Create comprehensive reports and interactive dashboards to present project findings.
- Visualize insights through charts, graphs, and visual representations.
- Communicate actionable recommendations for content optimization and user experience enhancement.

3. **<u>Visualization Selection:</u>**
    - **Time Series Visualizations**: Use line charts and time series plots to track and identify trends in website traffic over time.
    - **Histograms and Box Plots**: Employ histograms to visualize data distribution and box plots to summarize data distribution, including outliers.
    - **Geospatial Heatmaps and Maps**: Utilize heatmaps to depict traffic density across regions and geographic maps to display user locations and traffic sources.
    - **Regression and Scatter Plots:** Leverage regression plots to understand relationships between variables and scatter plots to visualize correlations.
    - **Interactive Dashboards**: Create interactive dashboards to integrate various visualizations and enable users to explore and analyze website traffic data interactively.

Here are some questions that can be answered through visualization based on website traffic analysis

1. What does the overall trend in website traffic look like?
2. How does the distribution of traffic sources change over time?
3. Which pages have the highest and lowest traffic on the website?
4. What is the click-through rate (CTR) for different elements or links on the site?
5. Can we identify any seasonal patterns or trends in website traffic?
6. Are there any significant traffic spikes or drops, and what caused them?
7. What is the geographical distribution of our website visitors?
8. Which devices (desktop, mobile, tablet) are visitors primarily using to access the site?

9. What is the average session duration for different traffic sources?
10. How does the bounce rate vary across different landing pages?
11. What are the peak days and times for website traffic?
12. Are there any notable differences in user behavior between new and returning visitors?
13. Which keywords are driving the most organic search traffic?
14. How effective are different marketing campaigns in driving traffic?
15. What is the conversion rate for various call-to-action (CTA) buttons or forms?